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FLOOD CONTROL ROOT RIVER BASIN, MINNESOTA.(U)
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Root River Basin, Minnesota

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The proposed action of the Root River basin consists of 3.1 miles of levees and 0.2 miles of road raises at Houston and encouragement of floodplain regulation and flood insurance at other flood-prone communities.

The constuction of the levee would result in temporary noise, increased traffic, possible dust pollution and road detours. Existing vegetation at the construction site would be destroyed.

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FINAL

ENVIRONMENTAL IMPACT STATEMENT

FLOOD CONTROL
ROOT RIVER BASIN
MINNESOTA

U.S. ARMY CORPS OF ENGINEERS
St. Paul District
March 1977

SUMMARY

FLOOD CONTROL
ROOT RIVER BASIN, MINNESOTA

( ) Draft Environmental Statement ( ) Revised Draft Statement

(X) Final Environmental Statement

Responsible Office: U.S. Army Engineer District, St. Paul, Minnesota

1. Name of Action: ( ) Administrative (X) Legislative

2. Description of Action: The proposed action for the Root River basin consists of 3.1 miles of levees and 0.2 mile of road raises at Houston and encouragement of floodplain regulation and flood insurance at other flood-prone communities and rural areas of the basin. Land treatment, bank stabilization, and water quality management programs are also encouraged.

3. a. Environmental Impacts: Protection from the 100-year flood would be provided to the community of Houston. Floodplain regulation and flood insurance in other areas would be designed to prevent future growth in flood damages and would make uses of existing flood-prone properties more restricted and/or expensive.

b. Adverse Environmental Impacts: The construction of the levee would result in temporary noise, increased traffic, possible dust pollution, and road detours in the immediate construction area. Existing vegetation at the construction sites would be destroyed.

4. Alternatives: The alternatives considered were flood warning and forecasting, floodplain evacuation and flood proofing, flood insurance and floodplain regulation, levees, channel modifications and levees, snagging and clearing, reservoirs, and no action.

5. Coordination: For a list of those who have been sent copies of the draft statement and from whom comments were requested, see page 43. A list of those who furnished comments on the draft statement and on the revised draft statement appears on page 45.

6. a. Draft Statement to CEQ: March 13, 1975.
b. Revised Statement to CEQ: September 8, 1976
c. Final Statement to CEQ: _____.

FINAL ENVIRONMENTAL IMPACT STATEMENT

FLOOD CONTROL
ROOT RIVER BASIN
MINNESOTA

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FINAL
ENVIRONMENTAL IMPACT STATEMENT

FLOOD CONTROL
ROOT RIVER BASIN
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1. PROJECT DESCRIPTION

LOCATION

1.01 The proposed project would be designed to reduce flood damage in the Root River basin located in southeastern Minnesota. The basin includes an area of approximately 1,660 square miles in Houston, Fillmore, Mower, Winona, Olmsted and Dodge Counties. The main stem has its source near Dexter, Minnesota, and has three main tributaries, the Middle Branch, South Branch and South Fork.

1.02 The authority for this study is provided by section 6 of the 1936 Flood Control Act, as amended by section 5 of the 1937 Flood Control Act. Additional authority was provided by section 11 of the 1946 Flood Control Act.

GENERAL PROJECT DESCRIPTION

1.03 The proposed plan for flood damage reduction in the Root River basin provides for structural and nonstructural measures. Approximately 3.1 miles of levees and 0.2 mile of road raises are proposed for Houston, Minnesota, to protect flood-prone areas from the 100-year flood. Flood damage reduction measures are encouraged at other flood-prone areas of the basin (Hokah, Preston, Peterson, Lanesboro, Whalen, and rural areas) and would consist of floodplain regulation and flood insurance. (See plate 1.)

1.04 It is not possible to accurately estimate a schedule for plan implementation. However, once the project is authorized and initially funded, it would take about 4 to 5 years to complete designs and construction, if subsequent funds were appropriated as needed.

STRUCTURAL

1.05 As stated above, the proposed plan for Houston, Minnesota, would consist of 0.2 miles of road raises and 3.1 miles of levees, 2.7 miles of which would involve upgrading existing levees and 0.4 miles of new levee which would be built on agricultural land (plate 2). The new levee would require approximately 2 1/2 acres of land. The levees would have a 10-foot top width, 1 on 3 riverward side slopes, and 1 on 5 landward side slopes. In addition,

a sand berm would be required on the landward side of the levee upstream of the Highway 76 bridge. The berm would be 3 feet high at the base of the levee and would be about 300 feet wide and about 1,700 feet long. The lack of impervious materials in the area and use of sand as levee fill account for the flattened landward slopes and berm which are necessary to reduce the effect of seepage through the levee during periods of high flood stages. The road raise would have 1 on 3 side slopes on the riverward side and 1 on 5 side slopes on the landward side and be constructed to existing roadway widths. Fill for the proposed levee and road raise would be obtained from selected sites in and adjacent to Houston. Although selection of these sites would not be established until post-authorization studies, care would be taken to avoid destruction of ecologically sensitive areas. Interior drainage facilities would be included to prevent flooding behind the levees in the event of heavy rains occurring simultaneously with Root River flooding. An existing emergency levee built by the Corps in 1969 extends east of Highway 76 and an existing levee built by the Minnesota Highway Department in 1955 extends west from Highway 76. This existing levee system would be upgraded and incorporated into the new levee system, and the new levee would be tied into the surrounding high ground west of Houston. The existing levees would have to be raised approximately 4 feet and 2 1/2 feet on the downstream and upstream portions respectively.

1.06 Landscaping and tree and shrub plantings (only on overburden areas or near the levee so that roots do not penetrate the seepage blanket or levee itself) are included as plan features to aesthetically improve the structural appearance of the levee. The plantings would also offset habitat loss to some extent.

1.07 The plan is economically feasible, with an estimated first cost of $3,896,000, an average annual cost of $238,000, average annual benefits of $622,000, and a benefit-cost ratio of 2.6 to 1.(1)

NONSTRUCTURAL

1.08 Floodplain regulation and flood insurance are encouraged to reduce flood damage at other flood-prone areas in the Root River basin. Floodplain regulation prevents or reduces flood damages primarily by regulating new development or redevelopment in the existing floodplain areas. Flood insurance assists in reimbursing affected property owners of the existing development for losses

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(1) Economic data which is based on a 100-year economic life, a 5 7/8 percent interest rate, and July 1974 price levels is extracted from U.S. Army Corps of Engineers Final Feasibility Report, Flood Control, Root River Basin, Minnesota. The complete document is available at the U.S. Army Corps of Engineers, St. Paul District, St. Paul, Minnesota.

sustained from flooding and prevents or reduces flood damages only insofar as floodplain management must be implemented for a community to receive full flood insurance benefits. This plan has a benefit-cost ratio of 0.8, 0.4, 0.9, 0.8, and 0.8 for the towns of Hokah, Whalen, Peterson, Lanesboro, and Preston, respectively. Unsubsidized crop insurance is also available under the Department of Agriculture Federal Crop Insurance Program. Both Houston and Fillmore Counties are eligible to participate in the crop insurance program.

1.09 The State of Minnesota has a floodplain regulation law that requires governing bodies (counties, cities) of flood-prone areas to adopt, enforce, and administer sound floodplain management ordinances within their jurisdictions whenever sufficient technical information is available for delineation of floodplains and floodways on their water courses. Pursuant to the provisions of the Flood Disaster Protection Act of 1973, the flood-prone communities must establish land-use controls (floodplain regulations) and participate in the flood insurance program to be eligible for further disaster relief loans.

1.10 Floodplain regulations are designed to modify land use and development in order to lessen the future effects of floods. Such measures require adoption and use of legal tools by local governmental units to control the extent and type of development permitted on the floodplain. This approach is in general agreement with the goals expressed by the Federal Flood Insurance Program and the Water Resources Council. Included in these goals are minimizing public expenditures, protecting life, and preventing or reducing flood damage to property. Restricted land use in flood-prone areas can be a major factor in reducing the economic impact of flooding.

1.11 Erosion and sediment control programs are identified and encouraged in cooperation with the Soil Conservation Service. Soil erosion rates cannot be quantified due to inadequate monitoring facilities and the large expanse of the basin. Further discussions of these programs are in paragraphs 2.76 through 2.78 and 6.24.

1.12 In order to improve water quality in the Root River basin, the Minnesota Pollution Control Agency has developed a water quality management plan. This plan outlines the basis for classifying the Root River as a water quality limited stream, contains abatement schedules for significant dischargers, and provides a procedure for processing grants and permits. The approach to developing the plan and defining various roles and actions was to identify the needs for improvement in municipal, industrial, agricultural, and other waste treatment practices. These needs were translated into plans, schedules, and recommendations for action by appropriate agencies. This plan is presented in the feasibility report.

1.13 In summary, the proposed action consists of the following measures:

a. Levees with adequate landscape treatment measures at Houston.

b. Floodplain regulation and flood insurance for other flood prone communities and rural areas of the basin.

c. Encourage local participation in land treatment and bank stabilization programs.

d. Encourage local participation in the water quality management program.

2. ENVIRONMENTAL SETTING WITHOUT THE PROJECT

INTRODUCTION

2.01 The Root River, which empties into the Mississippi River 694 miles above Cairo, Illinois, drains an area of about 1,660 square miles in Houston, Fillmore, Mower, Winona, Olmsted, and Dodge Counties in southeastern Minnesota. The watershed, which is almost elliptical in shape, is about 77 miles long and has a maximum width of 34 miles. The North Branch has its source near Dexter, Minnesota, and is joined, near the city of Chatfield, Minnesota, about 82 miles above the mouth, by the Middle Branch. The South Branch joins the river about 28 miles downstream from this point. These branches and the South Fork, which enters from the southwest near Houston, Minnesota, are of approximately equal size and are considered the main tributaries. From the mouth of the South Fork the river flows in a generally easterly direction, emptying into the pool created by lock and dam No. 8, about 20 miles below La Crosse, Wisconsin.

2.02 The Root River, above the North Branch and the mouth of the Middle Branch, flows through a valley consisting of rolling agricultural land. Between the mouth of the Middle Branch and the community of Peterson, the Root River valley is narrow and gorge-like, consisting of mostly cultivated land. There are few farm buildings on this portion of the valley floor and only one community, Whalen, Minnesota. Below Peterson the valley floor, which varies in width from 0.2 to 1 mile, is mostly cropland, with patches of woodland, meadow, and pasture interspersed between the cultivated areas. The communities of Peterson, Rushford, Houston and Hokah, Minnesota, are located along this portion of the river. Downstream from Hokah to the confluence with the Mississippi River, the Root River flows through cultivated and wooded floodplain land.

2.03 The Middle Branch of the Root River has the same general features as the North Branch above the mouth of the Middle Branch. The only community on this tributary is Spring Valley, Minnesota, which is upstream in the headwaters area.

2.04 The South Branch of the Root River is quite similar to the Middle Branch, although the topography below Preston, Minnesota, and especially below Lanesboro, Minnesota, is quite rugged. A State-owned fish hatchery is located on Duschee Creek, a tributary of the South Branch.

2.05 The lower reach of the South Fork flows through a narrow valley between high rocky bluffs which are cut by numerous tributary streams and gullies. Farther upstream the topography becomes less rugged and the valley merges into the undulating plateau of the headwaters area.

2.06 Drainage areas of the Root River and of certain tributaries together with channel distances above the mouth are listed in figure 1.

Figure 1 - Root River and tributary drainage areas and distances above the mouth (1)

Location	Drainage area (square miles) Tributary	Root River basin total	River miles above mouth of the Root River
ROOT RIVER BASIN			
North Branch above mouth of Middle Branch	199	199	81.6
Below mouth of Middle Branch	226	482	81.6
Gage near Lanesboro		615	54.5
Below mouth of South Branch	137	856	53.2
Gage above Houston		1,270	18.9
Below mouth of South Fork	293	1,385	16.3
Gage at Hokah		1,630	5.5
Below mouth of Root River		1,660	0

(1) Prepared by St. Paul District, Corps of Engineers

2.07 The total length of the river from the headwaters to the mouth is approximately 139 miles. The slope of the Root River is steepest in the upper reaches and decreases quite uniformly to the mouth, averaging approximately 8.5 feet per mile between its beginning and the mouth of the Middle Branch, 5.0 feet per mile between the Middle Branch and the mouth of the South Branch, and 2.9 feet per mile between the South Branch and its confluence with the Mississippi River.

2.08 Houston, the town where structural flood control measures are proposed, is a small community with a population of approximately 1,100. It is located about 20 miles from the mouth of the Root River in northwestern Houston County.

2.09 The area around Houston is primarily used for agriculture and grazing due to the flat to rolling topography. In some areas steep bluffs are present. The surface of the existing levees range from bare road to grass and tree cover. The present road surfaces are either asphalt or sand, the gravel roads either being township roads or roads in agricultural fields. The vegetation on the existing levees is primarily grass and/or trees, cottonwood being the predominant tree species present. The nearby floodplain forests are dominated by cottonwood with some ash and elm.

CLIMATE

2.10 The Root River basin climate is typical of the continental climate of the central United States and is characterized by wide and rapid temperature variations during all seasons. Temperatures in the basin have ranged from a low of -37°F to a high of 107°F. Such extremes, however, are generally of short duration. The average temperature is approximately 15°F in January and 75°F in July, while the average annual temperature is about 45°F.

2.11 Southeastern Minnesota winters are usually long and cold while summers are generally short and mild. The last killing frost in spring occurs about the 5th of May, and the first fall freeze occurs around the 5th of October. The average growing season is about 5 months.

2.12 The basin has relatively high precipitation. Average precipitation for the basin ranges from 27 to 32 inches per year. Of this more than half falls during the growing season, principally from brief summer thunderstorms and rainshowers. Of the yearly average of about 30 inches, approximately 16.5 inches of precipitation returns to the atmosphere by evaporation and 8.9 inches by transpiration. Therefore only about 4.6 inches of water remains in the groundwater cycle (including surface runoff) or is incorporated in organic material. Winter precipitation usually occurs as snowfall which remains on the ground until the spring thaw.

TOPOGRAPHY

2.13 The source of the Root River is in the extreme western portion of the basin at an elevation of about 1,350 feet above mean sea level (msl). On its way to the Mississippi River, the Root River drops approximately 633 feet in elevation until at its mouth it is only about 617 feet above msl. The course of the river is marked by many canyon-like stream valleys which are cut into the fairly level uplands.

2.14 The average elevation of the basin varies considerably on a gradient from west to east. Average elevations in the western sedgment of the Root River basin are approximately 1,360 to 1,400 feet above msl, while in the eastern sections near the confluence of the Root and Mississippi Rivers, the averages are closer to 900 feet above msl. In many parts of the eastern basin the bluffs rise as much as 500 feet above the valley floor, with limestone cap rock overlying layers of shale and soft sandstones.

GEOLOGY AND MINERAL RESOURCES

2.15 The geology of the basin is variable and generally reflects the influence of glaciation. An exception can be noted in eastern Winona County where a 10- to 20-mile-wide strip of land was unaffected by the most recent glacial period. Basin topography was formed some 500,000 years ago by erosion, and much of the basin was subsequently invaded by two successive continental glaciers. These glaciers, upon melting, deposited various quantities and types of glacial drift over much of the landscape. Kansan drift, termed "Old Gray Drift", is found quite commonly in the basin. Its eastern limit is near Caledonia in Houston County, and in the west it disappears quickly under younger drift, a product of subsequent glacial stages. The deposition of glacial drift in the basin covered preglacial ridges and valleys, thus smoothing the terrain considerably. Subsequent erosion has carved the landscape into its present state.

2.16 Most of the original glacial drift in the basin has been covered by material consisting predominantly of silt-sized particles transported by the wind. This material, called loess, was eventually deposited in varying thicknesses throughout the Midwest. Exposure of the easily eroded, silt-sized loess in the basin contributes to soil erosion and results in muddy, silty streams during high-flow periods.

2.17 Not all of the basin was glaciated. The driftless area found in eastern Winona County was not subjected to massive ice flows or drift deposition, and so the rugged preglacial features of the region were not altered or filled with drift material. This

section of southeastern Minnesota maintained its very rugged character and was further eroded by subsequent stream action. The topography of the section of Minnesota along the Mississippi River is the most rugged in the State.

2.18 Throughout the basin numerous rock formations are conspicuous. Near the western uplands some Cretaceous shales can be noted. However, most outcrops in the region are Paleozoic in age. Some of the more important outcroppings and/or formations in the basin include Galena limestone, Decorah shale, Plattsville limestone, Shakopee dolomite, New Richmond shale, and Oneota dolomite. An older Cambrian system can be found in the area and includes the St. Lawrence series of shales and sandstone, Dresbach sandstone, and Jordan sandstone.

2.19 Identified mineral resources in the basin are stone (limestone), sand and gravel, and iron ore. Since the mining of iron ores in the Spring Valley district ceased in 1968, the production of limestone and sand and gravel, from quarries and pits in each of the six counties, has been modest but steady (U.S. Bureau of Mines Minerals Yearbooks). The commodities are produced from operations both within and outside the flood plain. Other mineral resources, now subeconomic or undiscovered, may occur in the basin also. For example, Zietz reports a strong, cigar-shaped magnetic anomaly approximately between Lanesboro and Peterson ("A magnetic anomaly of possible economic significance in southeastern Minnesota," U.S. Geol. Survey Circ. 489, 1964); subsequent drilling revealed the cause: a body of titaniferous magnetite at a depth of about 800 feet (Sims, P. K. "Magnetic data and regional magnetic patterns," in Geology of Minnesota: A Centennial Volume, Minn. Geol. Survey, 1972, p. 592). (Prepared by U.S. Dept. of Int. Bur. of Mines, Denver, Colorado.)

2.20 The limestone and dolomite formations in the basin are of particular interest, as many of the springs that feed local streams originate there. Sinkholes (karst topography), some caves, and disappearing streams are all related to the underground drainage patterns common to limestone areas.

2.21 More detailed descriptions of the county geology can be found in The Geology and Underground Waters of Southern Minnesota by G. A. Thiel.

SOILS

2.22 The major soil groups to be found in the Root River Basin include the Fayette-Tama-Downs biosequence, the Ostrander-Kenyon-Floyd-Clyde toposequence, and alluvial soils. (Soil Conservation Service 1958.)

2.23 The Fayette-Tama-Downs sequence developed on calcareous Wisconsin loess under the influence of mixed hardwood or prairie vegetation. These soils are either light or dark colored silt loams on the uplands or in the valleys. The upland regions where this soil type is found are susceptible to erosion but can be productive.

2.24 The Ostrander-Kenyon-Floyd-Clyde sequence developed on Iowan till covered with loess under the influence of prairie vegetation. These soils are dark colored loams and silty clay loams on the uplands and in the valleys.

2.25 The undifferentiated alluvial soils are the dominant soils of the floodplain. These are a mixture of dark-colored soils that are so mixed they are usually not separated into series. Adequately drained alluvial soils are very productive and are usually used for agriculture or pasture.

2.26 The following five categories represent a more general discussion of basin soils.

a. Glacial upland soils - these soils are a part of the "Old Gray Drift" found in the western portion of the drainage area. These soils are classed as loams or silt loams. They generally have good drainage and are underlain by drift material of a clayey nature.

b. Loessial upland soils - these soils are found in the driftless area and the eastern portion of the "Old Gray Drift" area. Loess overlies the drift material and is subject to erosion on hills.

c. Rough stony land - these are residual soils and subsoils developed from underlying sedimentary strata. Most areas with this soil type are not suited for farming and have remained forested.

d. Terrace soil - these are silt loams and sandy soils of glacial outwash formation. The silt loams are productive while sandy loams are subject to erosion.

e. Floodplain soils - silty loams, sandy loams, and sand make up this general soil type. Much of the soil eroded from surrounding farm and pastureland eventually finds its way to the floodplain, adding to its enrichment. The silty loams found on the floodplain are generally very productive while the sandy loams are less productive and used for pasture.

FLORA

GENERAL

2.27 Studies indicate that the Root River basin is climatically suited to hardwood forest. However, at the time of settlement, well-developed forests were found only on the uplands in the eastern third of the basin and along the valleys of the larger streams (figure 2). Annual prairie fires retarded natural succession throughout the majority of the Root River basin. This retardation resulted in large areas of tall-grass prairie associated with scattered patches of brush and stunted groves of trees.

2.28 Fire has played an important role in maintenance of prairie ecosystems in several sections of the Midwest. Many prime agricultural areas have developed in the rich soils of prairies that were maintained by fire. Lightning is presently the major cause of forest and rangeland fires. Prior to settlement, many acres of prairie grasses, trees, and the encroaching forest edge were burned. The fires benefitted prairie vegetation types which, due to their extensive root system, started regrowth immediately, but destroyed the invading hardwood species. Conditions changed, however, when settlers converted much of the prairie into farmsteads and began controlling the fires. By 1880 forest growth had invaded much of the original prairie that had as yet escaped the plow. Man, by controlling fire and cultivating and pasturing the prairies, became a very influential factor in the basin ecosystem.

PRESENT VEGETATION

2.29 Due to the temperate conditions in the valley along the river a number of trees have extended their ranges well north of their normal ranges. The major species are: Kentucky coffee tree, honey locust, smooth buckeye, river birch, and sycamore.

2.30 Seedling reproduction and saplings typically have low densities in lowland stands. Germination and seedling survival are poor as a result of the periodic flooding, intolerance of shade, and requirement of bare soil for germination success. However, the plants that do survive and mature reach large size. Silver maples, cottonwoods, and swamp white oaks with a 17- to 20-foot circumference are not unusual. Poor reproduction also occurs in drier sites principally due to the dense canopy of mature trees. Woody shrubs and some degree of tree reproduction occur more commonly among forest edge types.

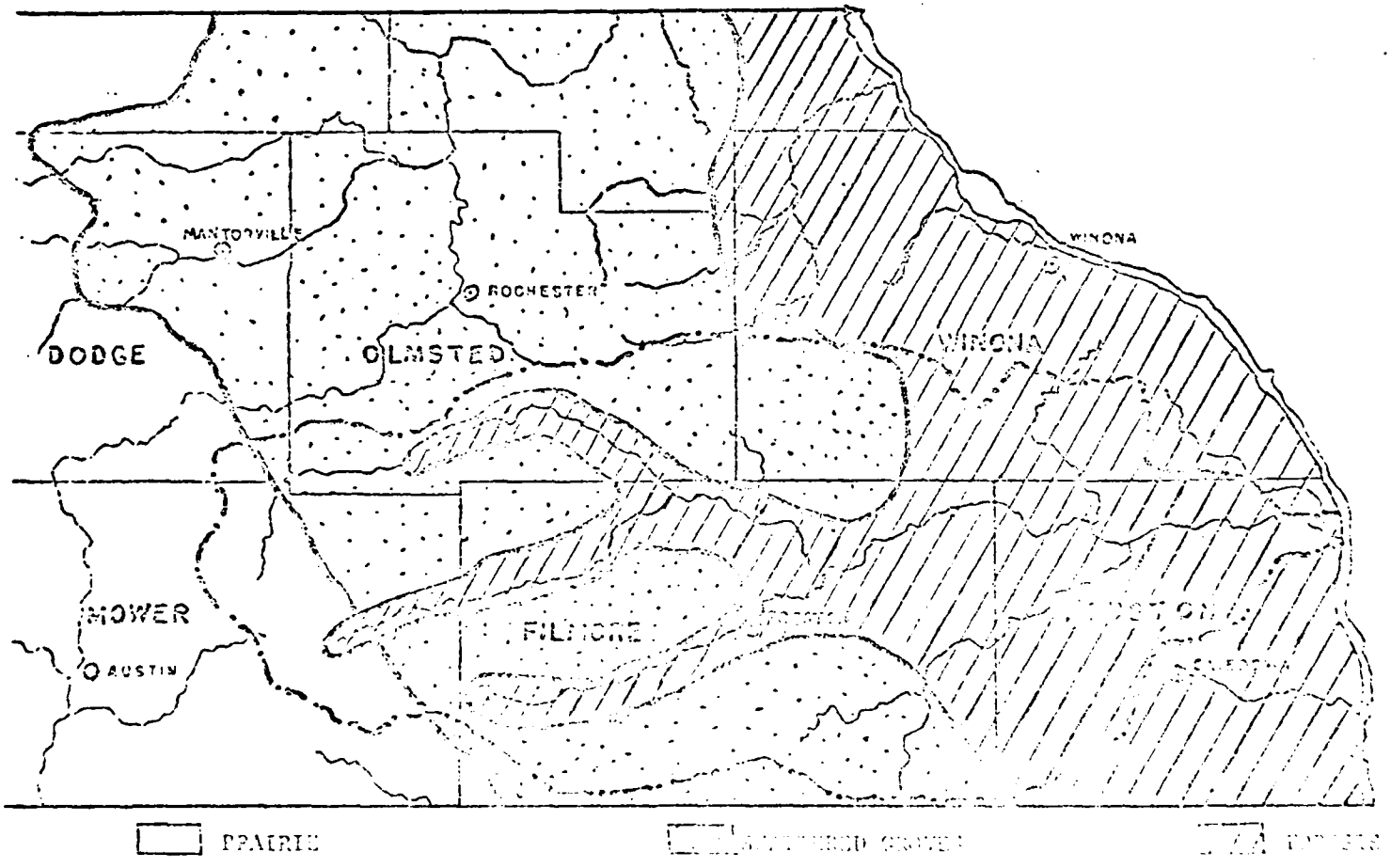

Figure 2 - Original vegetation in southeastern Minnesota
Adapted from: Trees and Shrubs of the Upper Midwest
by C.O. Rosendahl, 1970.

2.31 The woodlands in the watershed adjacent to most areas of the Upper Mississippi River can be divided into two general groups, the upland xeric southern forests of Wisconsin and Minnesota, and the southern lowland vegetation of the floodplain. The upland xeric forests are predominantly oak forests. They are located on well-drained sites on sandy and porous flatlands, on south and west slopes of hills, or on thin soils on hilltops and ridges.

2.32 The valley forests are commonly known as bottomland or floodplain forests and the lake border types are usually termed hardwood swamps. They are similar because the soil moisture supply is in excess of that falling as rain. These areas, along with the steep uncultivable bluffs and slopes, have been largely left to forests.

2.33 "Goat prairies," commonly observed on slopes facing south and west, generally consist of grasses and scattered, well-spaced brush and/or ground juniper. These areas are unique to slopes in the vicinity of the Mississippi River valley and relatively rare throughout the rest of Minnesota and Wisconsin.

2.34 Control of prairie fires tended to increase the amount of timber until expanding agriculture and lumbering reversed the process. Today a large portion of available timberland in the Root River basin is confined to river bottoms and surrounding slopes too steep for cultivation. A listing of prevalent plant species associated with deciduous forest types is presented in appendix A.

2.35 Much of the Root River basin is agriculturally oriented as evidenced by the lack of natural wildlife habitat. Field cultivated domestic crops such as corn and wheat have replaced the prairie grasses while many former wooded groves have been cut. Many of the remaining woodlots are heavily grazed by domestic stock, resulting in almost virtual elimination of forest understory growth.

2.36 Increases in the amount of farm and pastureland, coupled with generally substandard land management practices, have resulted in severe erosion and stream siltation in the basin. Most of these changes occurred prior to 1960; however, recovery will be slow.

2.37 Woodlots and the floodplain forests in this section of southeast Minnesota have been an important economic asset. Lumber and other wood products have been extracted from the forests of the basin. These woodlots can be classed as mixed mesophytic upland forest, generally consisting of two types: mixed hardwoods and oak. The mixed hardwood forest is comprised of hard maples, elm, and basswood while the oak woodlots contain pin oak, bur oak, white oak, ironwood, and some aspen. Farm woodlots are generally common throughout the basin and provide needed wildlife habitat for numerous species in a basically agricultural area.

2.38 Herbaceous ground cover is composed of species typical of mixed mesophytic woodlots in this latitude. Where the ground cover has not been severely overgrazed one can find such common species as May apple, trillium, spring beauty, adder's tongue, wood anemone, wild garlic, columbine, Dutchman's breeches, and rue anemone.

2.39 Historically the bottomlands and bluffs of southeastern Minnesota were well forested, and the forest extended 20 to 30 miles west across the uplands from the Mississippi River. A large part of this forest still stands but in somewhat modified form. Species characteristic of the southeastern deciduous forest include black oak, shagbark hickory, and black walnut on the uplands while the river birch, swamp white oak, Kentucky coffee tree, and silver maple are more common to the bottomlands. Throughout the area white pines are fairly common to north-facing bluffs. Similar natural groups of other conifers are known to occur. Jack pines, tamarack swamps, and white cedars, all more common to the north, can be found in the extreme eastern portion of the Root River basin. Red cedar and other junipers are common on dry bluffs throughout the area. West of the deciduous forest region is the prairie. The original deciduous forest region is east of the prairie. The original deciduous forest of southeast Minnesota has decreased considerably; however, large stretches have been preserved in parks and recreation areas. Much of the Root River basin is within the boundary of the Minnesota Memorial Hardwood State Forest.

2.40 Floodplain forests are subject to frequent flooding. In such situations plant species tolerant to alternate inundation and floodwater recession thrive while less tolerant species are absent. Woody species of vines common to floodplain situations include the grape and Virginia creeper.

2.41 Bottomland forests subjected to long-term flooding generally have less species diversity than bottomlands which undergo shorter periods of inundation.

2.42 Few good examples of tall-grass prairie can be found in the Midwest today, as most areas suitable for cultivation have long since been broken by the plow. Such is the case in the Root River basin. Originally about 80 percent of the basin area was prairie, but at present, remnants exist only along railroads and in protected fence corners.

2.43 The tall-grass prairie in southeastern Minnesota gradually merged with the deciduous hardwood forest in the eastern section of the Root River basin. Scattered groves of trees and peninsulas of floodplain forests encroached westward along the numerous tributaries of the Root River. Those remnants that have survived in areas not favorable for agriculture are representative of the original species composition.

2.44 Tall-grass prairies are dominated by grass species which require more precipitation than their shorter western counterparts. Tall grasses may reach a height of 5 to 6 feet under favorable conditions. Big bluestem, Indian grass, rye grass, porcupine grass, western wheat grass and many other species were common on upland Root River basin soils.

2.45 In wet, marshy areas of the prairie other species were predominant. Hydrophytic plants such as prairie cord grass, reed canary grass, cane sedges, and cattails were common. The lush grasses would generally cure by the end of summer when such composites as sunflowers, goldenrod, asters, and black-eyed Susan would be blooming. Other fall prairie plants included blazing star and snakeroot. Early in the spring, prairie phlox, violets, blue-eyed grass, pasque flowers, golden Alexanders, vetch, wild rose, fleabane, thistles, and milkweeds were common.

2.46 Most species associated with the tall-grass prairie can still be found in the Root River basin; however, they no longer exist in open, undisturbed areas but are confined to those areas man cannot profitably alter.

FAUNA

MAMMALS

2.47 The floodplain forest, deciduous hardwood forest, tall-grass prairie remnants, and agricultural lands provide a variety of habitats for a diverse mammalian fauna in the Root River basin. This portion of the upper Mississippi River system is zoogeographically unusual and subject to many external climatic factors including southerly influences.

2.48 The mammalian fauna representative of the Root River basin is typically of eastern-type (Alleghenian) with influences from some southern (Carolinian) and northern (Canadian) species.

2.49 A species list for the Root River basin is not available, but the Fish and Wildlife Service has compiled a pertinent list entitled, "Mammals of the Upper Mississippi Wildlife and Fish Refuge" (see appendix B). A total of 49 species has been reported in the general area which includes the Root River, and a similar species composition along the Root River and its tributaries would be expected.

2.50 Presently the only native large herbivore commonly found in the basin is the white-tailed deer. Their numbers are influenced primarily by habitat requirements and human disturbances. At the present time deer densities are relatively high due to an optimum balance of cover in the wooded areas and forage in the croplands Moose are not usually found in the basin although an occasional unconfirmed sighting is made. A few years ago, a moose which probably wandered into the basin from the north was killed near Houston.

2.51 Large carnivores were extirpated from the basin years ago leaving the red and gray fox and an occasional coyote or bobcat as the major large predators. Wolves, black bear, and cougar were once common to the area. Two recent sightings of black bear were made during the winter of 1972-73 in the Whitewater State Wildlife Management Area west of Winona. In fact, one young bear was shot near a farmhouse. Wolf sightings are also reported at times in the basin, but have not been confirmed.

2.52 Numerous rodent species provide a major source of food for the common predators in the basin. Ground squirrels, chipmunks, squirrels, and several species of mice are the more common rodents reported. Beaver, muskrats, and nutria (a rare visitor) are other rodents that can also be found in the basin region. These forms are often associated with trapping where they occur in large numbers. Nutria, for example, which superficially resemble muskrats, have been trapped near Winona. Trapping for beaver was common until 1910 when a closed season on beaver and otter was imposed to prevent species decimation. Other mammals common to the Upper Mississippi River basin and the Root River include two species of skunk, badger, mink, river otter, two species of weasel, two species of moles, jack rabbits, shrews, cottontail rabbits, and six species of bats.

BIRDS

2.53 The diverse species composition of birds occurring in the basin could be assumed similar to that recorded for the Upper Mississippi Wildlife and Fish Refuge. A listing of species and their relative abundance at various times of the year is presented in appendix C. The list includes 19 raptors, 48 waterfowl and wading birds, 28 shorebirds, 33 warblers, and numerous other groups. Upland game birds associated with the basin include the ring-necked pheasant, ruffed grouse, gray (Hungarian) partridge, bobwhite quail, and woodcock. Locally protected game birds such as the greater prairie chicken and sharptail grouse are observed on rare occasions.

REPTILES AND AMPHIBIANS

2.54 Reptiles and amphibians observed within the Upper Mississippi Wildlife and Fish Refuge are presented in appendix D. In all probability, most, if not all, of the indicated species can be found within the Root River basin. At least 9 species of turtles, 13 snake species, 9 frog species, and others are found in varying degrees of abundance.

FISH

2.55 Some of the more desirable fish species found in the basin from a recreational viewpoint include three species of trout, two species of bass, and assorted "panfish". The area is especially noted for its numerous clear, fast-flowing trout streams, which support healthy populations of both native and stocked trout. A listing of species known to occur in the basin is presented in appendix E.

RARE AND ENDANGERED SPECIES IN THE ROOT RIVER BASIN

2.56 Certain species of mammals, birds, and fishes suffered a drastic decline following white settlement of the Root River basin. Buffalo, elk, antelope, and cougar were among the first species to be eliminated or displaced. Further increases in settlement and habitat alteration brought about a decline in numbers of other species such as the wolf and whooping crane. Continued changes on a national scale and other factors such as widespread use of pesticides and illegal shooting brought about decreases in the population levels of northern and southern subspecies of the bald eagle, peregrine falcon, osprey and trumpeter swan. A list of native endangered wildlife of the United States protected by the Endangered Species Act of 1973, PL 93-205, which may occur in the Upper Mississippi River basin is presented in appendix F. Fauna which are considered to be rare or uncommon in the basin are presented in appendix G.

2.57 Species of plants which may occur in the area and which are legally protected in the State of Minnesota[1] include:

a. Trailing Arbutus (Epigaea repens)

b. Gentian genera (Gentiana sp.)

c. Lily genera (Lilium sp.)

d. Lotus lily (Nelumbo lutea)

e. Orchid family (Orchidaceae)

2.58 Within the southeastern section of the State of Minnesota rare and endangered plant species can be found in two habitat types. Within the moist prairie type wild orange-red lily (Lilium philadelphicum), shooting star (Dodecatheon meodia), small white ladyslipper (Cypripedium candidum), prairie phlox (Phlox pilosa) and blue-eyed grass (Sisyrinchium angustifolium) can occasionally be found. Within the open deciduous forest bluebell or lungwort (Mertensia virginica), Minnesota trout-lily (Erythronium propullans), and putty root (Aplectrum hyemale) can in rare instances be found. (Morley, 1972)

(1) Minnesota Department of Resources, no date, and Morley, 1972.

WATER QUALITY

2.59 Water quality data are not readily available for the entire basin, but a monitoring station is established a short distance upstream from the mouth of the Root River in Houston County. Some information obtained from this station appears in figure 3. The relatively high fecal coliform concentration probably indicates additions to the river from agricultural and possibly urban sources. The significance of the BOD and suspended solids would depend on river stages; for example, it would be more significant as flows were reduced.

Figure 3 - Comparison of the water sampling data with water quality and effluent standards of the area

Water quality parameters	Root River Hokah(1)	Water quality and effluent standards: Limiting concentration(2)	Water quality and effluent standards: Limiting concentration(3)
Biochemical oxygen demand (mg/l)	2.5	23	5
Total suspended solids (mg/l)	116	30	5
Fecal coliform group organisms (MPN/100 ml)	5,570	200	200
Pathogenic organisms		None	None
Oil		Free of visible floating oil	Free of visible floating oil
Turbidity (JTU)	32	25	25
pH	7.8	6.5 - 8.5	6.5 - 8.5
Unspecified toxic or corrosive substances		None at levels acutely toxic to humans or other animals or plant life, or directly damaging to real property	

(1) MPCA station located on State Highway 26 bridge, 3 miles east of Hokah. (MPCA, 1971)

(2) The municipalities of Chatfield, Houston, Lanesboro, and Peterson, discharging wastes on a continuous basis, shall meet these limiting concentrations. (Regulation WPC 14 in Root River Segment Plan by MPCA, 1974).

(3) Where the streamflow rate above the discharge point is not sufficiently greater than the effluent flow, the applicable water quality standards for discharging of wastes on a continuous basis shall meet these limiting concentrations. (Regulation WPC 24 in Root River Segment Plan by MPCA, 1974).

WATER SUPPLY

2.60 Groundwater is the source of all municipal and industrial water supplies in the Root River basin. Current studies indicate the existing groundwater supplies are adequate to meet current and projected water supply demands. However, the Minnesota Pollution Control Agency indicates that the quality of surface waters of the Root River does not meet the water quality and water use standards established for the Root River basin. Recent sampling has indicated that the Root River has high concentrations of total dissolved solids, total suspended solids, turbidity, and total group coliform.

ARCHAEOLOGICAL INVESTIGATIONS

2.61 In compliance with Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593, the National Register of Historic Places has been consulted and as of 1 February 1977 there are no listed sites that would be affected by the proposed project. In addition, it has been determined that no natural landmarks will be affected. The potentially significant Mystery Cave in southwest Fillmore County is not included in the area of impact.

2.62 Coordination has been continued with the National Park Service, the Minnesota State Archaeologist, and the State Historic Preservation Officer (SHPO). Their responses to the revised draft EIS are included in Appendix H. The known cultural resources in the Root River basin have been identified and located in a report prepared in 1974 by Elden Johnson, State Archaeologist, while under contract with the Corps of Engineers. Forty-four prehistoric sites were located, including burial mounds, village occupations, and rock shelters. Four historic sites were identified in the report. None of these sites will be affected by the proposed project. In addition, the SHPO has indicated that prehistoric artifacts have been collected in the area of Houston, although no specific sites are known for this area.

2.63 There is considered to be a high potential for the existence of other prehistoric, historic, and architectural resources which are currently unknown. A cultural resource survey will be conducted in the areas of impact to identify and locate all such resources and assess their significance. This survey will be done during the Phase II planning stages. The areas of impact include the levees, road raises, drainage facilities, and borrow areas in and around Houston. If the proposed plan is modified, the additional impact areas will also be surveyed.

SOCIOECONOMIC

2.64 The Root River basin is located in southeastern Minnesota and is considered an agricultural area. With its rolling countryside, towering bluffs, and picturesque streams, the scenery of the basin is unique to the State of Minnesota. For this reason, the basin has been nicknamed "Root River mountain land." Many historical landmarks of the early days of settlement dot the area and include everything from caves to museums to abandoned towns. The basin offers many summer and winter recreation facilities, which include public and private campgrounds, State parks, golf courses, fishing and hunting areas, and various points of interest.

HUMAN RESOURCES

2.65 The Root River basin, with a 1970 population of 39,2[illegible], has an area of 1,660 square miles for a population density of about 24 persons per square mile. Houston and Fillmore Counties, with areas of 309 and 763 square miles, respectively, represent 65 percent of the total basin area and probably reflect population trends in the Root River basin. Historic and projected population and related data for the communities of Houston, Hokah, Preston, Peterson, Lanesboro, and Rushford, and for Houston and Fillmore Counties and related areas are shown on figure 4. Figure 5 identifies the population change by index for the communities and counties previously listed.

2.66 Population projections for the other counties in the basin would not reflect the same trends because a large percentage of their population is located outside the basin area.

Figure 4 - Historic and projected population, 1950-2030[1]

Area	Year 1950	1960	1970	1980	2000	2020	2030
Communities							
Hokah	643	685	697	770	962	1,246	1,390
Houston	973	1,082	1,090	1,137	1,270	1,457	1,570
Lanesboro	1,100	1,063	850	820	768	742	740
Peterson	318	283	269	296	344	363	390
Preston	1,399	1,491	1,413	1,458	1,472	1,490	1,500
Rushford	1,270	1,335	1,318	1,330	1,370	1,408	1,415
Counties							
Fillmore	24,465	23,768	21,916	20,000	16,400	12,700	10,800
Houston	14,435	16,588	17,556	18,500	20,350	22,240	23,180
OBE area 06089[2]	255,063	255,185	269,467	292,900	357,900	450,800	506,700
OBE area 06090[2]	200,144	230,984	247,108	281,300	350,800	439,600	484,000
United States	151,315,798	179,323,175	203,184,772	234,193,000	306,758,000	397,562,000	453,018,800

(1) Compiled by St. Paul District, Corps of Engineers.

(2) Based on series "E" Projected National Population, Bureau of Census, 1972, U.S. Department of Commerce, Office of Business Economics. (Taken from volume 2, BEA Economic Areas.)

Figure 5 - Indexes of population change, 1970-2030 (1)

Area	Year 1970	1980	2000	2020	2030
Communities					
Hokah	100	110	138	179	[illegible]
Houston	100	104	117	134	144
Lanesboro	100	96	90	87	87
Peterson	100	110	128	135	[illegible]
Preston	100	103	104	105	[illegible]
Rushford	100	101	104	107	107
Counties					
Fillmore	100	91	75	58	[illegible]
Houston	100	105	116	127	[illegible]
OBE Area 06089	100	109	133	167	188
OBE Area 06090	100	114	142	178	196
United States	100	115	151	196	[illegible]

(1) Prepared by St. Paul District, Corps of Engineers

DEVELOPMENT AND ECONOMY

2.65 Employment increased 36 percent between 1940 and 1970 (figure 6) in Houston County, while for the same period employment decreased 4 percent (figure 7) in Fillmore County. During this period, gains in employment for both counties were recorded in all industries except agriculture, forestry and fisheries, and mining. Employment in agriculture and forestry and fisheries decreased about 50 percent in both counties. Some of this loss can be attributed to an out-migration of young adults from the area to the surrounding major urban areas of Winona, Rochester, and Austin, Minnesota, and La Crosse, Wisconsin.

2.66 Future land use needs to the year 2000 have been identified in a "Land Use Plan" for Houston County, prepared in 1965 by Mason, Law, Wehrman and Knight, Inc. The purpose of the report was to reveal and analyze existing and anticipated future development problems, clarify needs and goals, and indicate steps to implement these planning solutions. Also, the State of Minnesota encourages all counties to develop future land use plans.

Figure 6 - Employment by industry, Houston County, Minn. 1940-1970 (1)

Industry	Year							
	1940		1950		1960		1970	
	Number	Percent of total	Number	Percent of total	Number	Percent of total	Number	Percent of to
Agriculture, forestry & fisheries	2,974	60.4	2,912	50.6	2,115	37.2	1,558	23.2
Construction	198	4.0	350	6.1	408	7.2	507	7.6
Manufacturing	190	3.9	500	8.7	823	14.5	1,198	17.8
Transportation, communication services	127	2.6	263	4.5	234	4.1	351	5.2
Wholesale & retail trade	549	11.2	738	12.8	875	15.4	1,342	20.0
Finance, insurance, & real estate	55	1.1	65	1.1	126	2.2	129	2.0
Services	682	13.9	753	13.1	806	14.2	1,463	21.8
Government	82	1.7	100	1.7	168	3.0	147	2.2
Mining and industry not reported	61	1.2	79	1.4	126	2.2	18	0.2
TOTAL	4,918	100.0	5,760	100.0	5,681	100.0	6,713	100.0

(1) Prepared by St. Paul District, Corps of Engineers

Figure 7 - Employment by industry, Fillmore County, 1940-1970 (1)

Industry	Year							
	1940		1950		1960		1970	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
Agriculture, forestry & fisheries	4,871	58.5	4,755	51.0	3,443	40.9	2,518	31.5
Mining	27	0.3	47	0.5	65	0.8	21	0.3
Construction	311	3.7	579	6.2	494	5.9	450	5.6
Manufacturing	223	2.7	384	4.1	443	5.3	807	10.1
Transportation, communication, and utilities	259	3.1	377	4.0	390	4.6	403	5.0
Wholesale & retail trade	1,011	12.1	1,442	15.5	1,549	18.4	1,492	18.7
Finance, insurance, and real estate	121	1.5	153	1.6	227	2.7	202	2.5
Services	1,169	14.0	1,208	13.0	1,357	16.1	1,888	23.6
Government	155	1.9	192	2.1	174	2.1	218	2.7
Industry not reported	183	2.2	191	2.0	268	3.2	0	0
TOTAL	8,330	100.0	9,328	100.0	8,410	100.0	7,999	100.0

(1) Prepared by St. Paul District, Corps of Engineers

TRANSPORTATION FACILITIES

2.67 Excellent transportation facilities serve the basin. Railroad service is provided by the Chicago, Milwaukee, St. Paul and Pacific Railroad. Good highway service including State Highways 63, 52, and 16 and Interstate Highway 90 links the basin to Winona and Rochester, Minnesota, and La Crosse, Wisconsin. These three metropolitan areas also provide airline service within a short driving distance of any point in the basin. A small airfield is also located at Preston.

RECREATION

2.68 There are numerous recreational opportunities available in the Root River basin and there is great potential for expansion. Throughout the Root River basin, the existing recreational facilities include State parks, picnic areas, golf courses, campgrounds, and hiking and horseback trails. The two State Parks located in the basin are Forestville State Park near Preston and Beaver Creek Valley State Park near Caledonia. Hunting for both small and big game is also locally and regionally important throughout the basin. Trout fishing is practiced on some of the tributaries to the Root River. Other important recreation activities in the area include canoeing, camping, picnicking, sightseeing, swimming and snowmobiling. In 1967 the State of Minnesota designated the Root River a canoe and boating route river. Since then, the main emphasis for recreation has been on canoe-related activities. Many people camp on the Root River at convenient locations, but have to use inadequate facilities. The Minnesota Department of Natural Resources recently updated its Statewide Comprehensive Outdoor Recreation Plan (SCORP) which indicates that this area of the State is probably Minnesota's most unrecognized recreation region relative to the overall potential of the area (Minnesota Department of Natural Resources, 1974). Also, the Department of Natural Resources has indicated that the Root River had been identified as a potential river for study for possible inclusion in the State system of wild and scenic rivers. The State has authorized the Root River trail along the river. This development is in its early planning stages and a final location for the trail has not been selected, although the trail is to generally follow the Root River between Chatfield and Hokah.

FLOOD HISTORY

2.69 The Root River valley is usually subjected to at least one flood, and quite frequently two or more floods each year. Flood flows in the basin are characterized by their very rapid rise, short duration, and almost as rapid subsidence. These characteristics are attributed largely to the rugged topography of the basin. Spring floods occur with remarkable regularity during the latter part of March or the early part of April, generally due to a combination of melting snow and rainfall. Floods due to snowmelt have also occurred during the months of January and February. Ice jams, which occur frequently during these winter and spring floods, have caused as much as 5 to 6 feet of backwater. Summer and early fall floods, because of their relatively greater damaging effects on agriculture, are generally the most serious; however, they do not occur as regularly as spring floods.

2.70 A large number of serious floods have occurred in the Root River valley since its settlement. The largest flood of record on the Root River at Houston occurred on 1 April 1952 and caused extensive damages to Rushford, Houston, and most of the lower portion of the basin.

2.71 The principal areas inundated by floods are the communities and agricultural land along the main stem and the lower portion of the South Branch Root River. These communities are Whalan, Peterson, Rushford, Houston, and Hokah along the main stem and Preston and Lanesboro along the South Branch. A flood having one chance in 100 of occurring every year would have different discharges at each of the flood prone communities as shown on figure 8.

Figure 8 - 100-year flood discharge and elevation at each flood prone community

Flood-prone communities	100-year flood discharge (cfs)(1)	Elevation of 100-year flood (feet above msl)
Hokah	57,000	651.8(2)
Houston	51,500	688.0(3)
Rushford	45,400	730.2(4)
Peterson	44,800	751.5(5)
Whalan	43,600	792.5(6)
Lanesboro	23,200	831.0(7)
Preston	18,000	944.0(8)

(1) USGS and Corps of Engineers administratively adopted discharges.
(2) At U.S. Highway 16 bridge.
(3) Above Highway 76 bridge.
(4) Above U.S. Highway 16 and 43 bridge.
(5) At State Road 25 bridge.
(6) At Root River bridge.
(7) Above Highway 250 bridge.
(8) At St. Paul Street Bridge.

2.72 Based upon the existing topographic information, the 100-year flood would inundate about 17,235 acres of the Root River valley. An estimate of the land use for this 100-year floodplain is shown on figure 9.

Figure 9 - Land use for the 100-year floodplain of the Root River basin(1)

Land-use category	100-year floodplain Acres	Percentage of total basin
Marsh	210	1
Forest	4,909	29
Cropland	9,352	54
Pasture	2,629	15
Urban residential	135	1
Urban nonresidential(2)	-	
Total	17,235	100

(1) Estimated from the State of Minnesota land use map, 1969.
(2) A 40-acre plot that contains at least one commercial, industrial, or institutional development and may or may not contain residential development.

2.71 Present flood damages include both tangible and intangible losses. Tangible losses suffered during floods include: inundation damage to both residential and commercial structures [illegible]ilities, and transportation facilities; flood-fighting costs; [illegible] flood cleanup costs; business losses; and increased expenses for normal operating and living during a flood situation. Based on the frequency of past flooding and damages sustained during those floods, the Root River basin presently sustains an average of about $1.35 million annually in flood damages. A breakdown of the average annual damages for each flood prone community and total basin is shown on figure 10. Intangible losses suffered include: loss of life, human misery during a flood occurrence, disruption of normal community activities, potential health hazards from contaminated water and food supplies, dislodged fuel storage tanks and pipelines, and flooding of sewage collection and treatment facilities. The health and safety of residents in the study area are directly affected during major flood periods. A serious threat of life and limb is always present during floods due to flooded residences and related risk of drowning, electrical shocks, and injurious falls, and due to attempted movement over flooded thoroughfares. Other threats to public health include impeded local traffic flow because of sightseers, backup of sewers into basements, migration of vermin from flooded areas, contamination of water supplies, and increased vector production during a major flood.

Figure 10 - Detailed estimate of present and future average annual flood damages without protection, July 1974 prices(4)

Type of damage and area affected in basin	Weighted average damage per acre	Average annual area flooded (acres)	July 1974 condition	1980 Conditions	2030 Conditions	Actual increase 1980-2030	Average annual equivalent increase at 5 7/8 percent(3)	Total average annual equivalent damage over 100-year life(3)
URBAN								
Preston			$ 16,700	$ 17,500	$ 25,400	$ 7,900	$ 2,700	$ 28,100
Lanesboro			15,800	15,800	15,800	---	---	15,800
Whalan			2,200	2,200	2,200	---	---	2,200
Peterson			21,800	22,900	33,200	10,300	3,500	26,400
Rushford			12,600	13,200	19,100	5,900	2,000	15,200
Hokah			13,700(2)	13,700	14,300	600	200	13,900
Houston								
Residential			472,800	495,500	861,700	366,200	123,600	619,100
Commercial			78,200	78,200	78,200	---	---	78,200
Public			20,000	20,500	28,300	7,800	2,600	23,100
			(571,000)	(594,200)	(968,200)	(374,000)	(126,200)	(720,400)
Total Urban								822,000
CROP								
Reach 1	$22.37	1,643(2)	36,800	42,100	73,100	31,000	10,500	52,600
Reach 2	22.37	2,040	45,600	52,300	90,700	38,400	13,000	65,300
Reach 3	22.37	223	5,000	5,600	9,700	4,000	1,400	7,000
Total Crop			87,400	100,000	173,500	73,400	24,900	124,900
OTHER AGRICULTURAL								
Reach 1			66,700(2)	76,600	133,000	56,400	19,000	95,600
Reach 2			71,200	81,700	141,800	60,100	20,300	102,000
Reach 3			7,700	11,100	19,300	8,200	2,800	13,900
Total Other Agricultural			147,600	169,400	294,100	124,700	42,100	211,500
TRANSPORTATION								
Reach 1			104,700(2)	104,700	104,700	0	0	104,700
Reach 2			54,000	54,100	54,100	0	0	54,100
Reach 3			13,600	13,600	13,600	0	0	13,600
Total Transportation			172,300	172,300	172,300	0	0	172,300
Total Average Annual Damage								1,320,900

(1) Remaining damage after local project.
(2) Includes increased damages due to aggradation.
(3) Average annual equivalent factor for 100-year economic lift with straight line growth for first 50 years and no growth recognized for final 50 years of project life is 0.9375 based on a discount rate of 5 7/8 percent.
(4) Prepared by St. Paul District, Corps of Engineers.

2.74 Flood damages to crops and pastures have been considerable but vary according to the month of the year. Direct damages to crops and pastures result in indirect losses to the marketing agencies which would have handled the agricultural products and to retailers with whom farmers and others would have spent the income from the crops destroyed by floods.

2.75 Direct flood damages in this valley have certain effects which cause additional or indirect losses elsewhere. Certain indirect losses would occur as the result of the detouring of highway and railway traffic during and immediately subsequent to floods. Indirect urban damages, consisting principally of the relief and rehabilitation of flood victims, would also result from floods.

EROSION AND SEDIMENTATION

2.76 Besides urban and rural flood problems, local interests have identified soil erosion in the headwaters and streambank areas and sedimentation in downstream channels and floodplain areas as major problems in the Root River basin. The major types of erosion in the basin include sheet, rill, gully, and channel erosion. Erosion of cropland, pastureland, streambanks, and gullies is considered to be the principal source of sediment. Figure 11 identifies, by county, sources of sediment in the Root River basin.

Figure 11 - Sediment Sources for the Root River Basin[1]

Type Sediment and Sources	Erosion Hazard by Counties in the Root River Basin					
	Houston	Fillmore	Mower	Winona	Olmsted	Dodge
Fine[2]						
Agricultural Land	Severe	Severe	Serious	Severe	Serious	Moderate
Sands						
Gully	Severe	Severe	-	Serious	Moderate	-
Streambank						

[1] Prepared by U.S. Department of Agriculture

[2] Silts and clays

2.77 During recent years an attempt has been made to adequately treat the lands which are the major sources of sediment in the basin. Current records indicate that approximately 35, 58, and 46 percent of the total acres of cropland, woodland, and pastureland, respectively, in the basin are adequately treated. The number of farming units in the basin and the percentage of those farming units (cooperatives) that do apply various land treatment

measures to their farms are identified by counties on figure 12. Also, figure 12 identifies the various land use breakdowns (cropland, woodland, pastureland) and estimates the current percentage of adequately treated land for each county in the basin.

Figure 12 - Farming units, cooperatives, land use, and percent of treated land by county for the Root River basin(1)

Item	Houston	Fillmore	[illegible]	Dodge(2)	[illegible]	[illegible]
			Counties of the Root River basin			
Farming units	809	2,184	617	16	515	400
Number of cooperatives	638	1,449	380	12	265	307
Land-use acres						
Cropland	76,160	318,780	125,450	3,355	60,000	75,840
Woodland	99,730	80,730	9,650	130	20,750	30,290
Pastureland	15,560	54,660	2,760	250	19,990	20,280
Percentage of land adequately treated						
Cropland	65	28	25	42	40	43
Woodland	70	50	80	80	32	50
Pastureland	25	42	35	[illegible]	60	20

(1) Prepared by St. Paul District, Corps of Engineers
(2) Estimates for the 6.3840 sq. miles in Dodge (supplied by U.S. Department of Agriculture).

2.78 As identified above, only portions of the basin are adequately treated for erosion problems. Therefore, a definite need still exists for various land treatment, bank protection, and other measures to preserve the surface soils of the basin and to diminish sediment inflow into the Root River and tributary streams.

EXISTING PROJECTS

2.79 A Federal flood control project that provides protection at Rushford from the Root River and Rush Creek flooding was completed in 1969. The project consists of channel modification along the Root River and Rush Creek, two channel cutoffs along the Root River, a system of levees and floodwall along both the Root River and Rush Creek, a sandbag closure, two trunk highway bridge raises, a railroad grade raise, and appropriate interior drainage facilities. The modifications constructed provide freeboard over Root River and Rush Creek floods having a frequency of about once in 100 years. Modification of the existing design at Rushford, on the Root River, requires the movement of the channel, bank riprap, and fill. An Environmental Assessment has been prepared by the Corps of Engineers for this project.

2.80 The Soil Conservation Service under the Public Law 46 program has completed construction of a pilot watershed for flood protection on East Willow Creek near Preston. This project, which controls a drainage area of about 38 square miles, consists of a small floodwater-retarding structure and appropriate headwater land treatment measures. A completed Public Law 566 project exists on the Rush-Pine

Creek watershed near Rushford. This project consists of stabilization of three critical sediment source areas. Applications for PL 83-566 assistance has been made to and approved by the State Soil and Water Conservation Commission for the Thompson Valley Watershed near Hokah, South Fork Root River Watershed and Beaver Creek Watershed. However, because of the lack of local support, the applications have been returned to the sponsors on the South Fork Root River Watershed and Beaver Creek Watershed.

2.81 In 1916, upon petition of property owners, the State District Court established Judicial Ditch No. 1 in Houston County. Construction of this ditch in 1917 and 1918 consisted of about 20 miles of channel straightening on the Root River from about Houston to the mouth. This shortened the river a distance of about 12 miles. Although most of the ditch was constructed, records indicate the contractors did not construct the ditch according to all of the plans and specifications. Therefore the contract was never completed. This study did not specifically examine the District Court records; however, it is assumed that the lower Root River is still classified as a judicial ditch. If this is the case, then according to State law, Houston County is still responsible for maintaining the ditch. Discussions with local interests have indicated that outstanding assessments still exist on the initial construction. This problem would have to be fully evaluated and corrected as necessary, in order to initiate operation and maintenance on the ditch. Removal of the designation of a portion of the Root River as a judicial ditch would not preclude future channel inprovements. These improvements would, however, require a permit under Minnesota Statutes Chapter 105, unless undertaken by a Federal agency.

2.82 Other modifications consist of several levees built by local farmers near Hokah to protect their land, and a 1½-mile-long levee built by the Minnesota Department of Highways near Houston to protect U.S. Highway 16 and Houston.

3. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

3.01 Future land use needs to the year 2000 have been identified in a Land Use Plan for Houston County, prepared by Nason, Law, Wehrman and Knight, Incorporated, in 1965. The purpose of the report was to reveal and analyze existing and anticipated future development problems, clarify needs and goals, and indicate steps to implement these planning solutions. This information is integrated into the proposed plan for Houston and would be implemented in future studies. Also, the State of Minnesota encourages all counties to develop future land use plans.

3.02 Floodplain regulations are designed to modify land use and development in order to lessen the future effects of floods. Floodplain regulations would prohibit future non-conforming uses of flood-prone areas. Non-conforming uses in existence at the time land use regulations are adopted may continue to exist and be repaired and maintained for the life or use of the structure. Floodplain regulations are most effective in regulating future land use. This plan would comply with the goals of the canoe and boating route river designation and also the State's wild and scenic rivers proposal. Floodplain regulation would not allow non-conforming developments and would keep the floodplain in a biologically more productive state.

3.03 Both commercial and residential expansion is expected at Houston. By 2030, approximately 90 acres will be developed in the Houston area. The expansion is predicted as follows: 55 acres residential, 11 acres commercial, 8 acres public and semi-public, and 16 acres streets. It is estimated that use of the floodplain will be similar at 2030 conditions with or without project protection.

3.04 Property owners in special flood hazard areas must obtain flood insurance coverage to qualify for new mortgage or home improvement loans. Over a long period of time virtually all homes and businesses subject to flood damage will be covered. Under floodplain regulations the existing flood-prone developments would be non-conforming uses which would be eliminated or upgraded over a period of years. This process would be a protracted one, but would to some degree reduce the severity of flood damage. Although flood damages would continue to increase in the short run, they may well peak and then decrease as non-conforming uses within the floodplain are gradually eliminated or upgraded.

4. ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

4.01 If the proposed flood control project is authorized some biological, social, and economic impacts can be anticipated.

4.02 The proposed levee construction would result in modification of the topography. The construction would not be expected to have any widespread impacts on geologic features or soils. The proposed levees should not have substantial recreational or aesthetic impacts, and are not expected to affect any endangered species of wildlife or any species protected by Federal law. Because an emergency levee already exists along much of the proposed alignment, the construction should not significantly affect existing streambank vegetation. The existing Highway Department and Corps emergency levees are taken to be part of the existing environmental setting. It is apparent that most of the

environmental impacts and acceptability of environmental design with respect to levee alignment are predetermined during emergency actions in the case of proposed upgrading of existing emergency levees. However, the environmental impacts and design associated with refinements in the interior drainage facilities and future developments are not necessarily predetermined by the emergency levees. Although construction of the levees and road raises would destroy some natural vegetation, landscaping and tree and shrub plantings would be included as design features to partially offset these habitat losses. In addition, these plantings would aesthetically improve the appearance of the levee. The levee raises on the east side of town would require the removal of about 10 trees and a few shrubs. Plantings to replace removed trees could be incorporated into the proposed plan. The proposed new levee and berm at the base of another levee are located on agricultural land. The selection of borrow areas would be done so as to avoid adverse impacts on vegetation, water and air quality, wildlife, and wildlife habitat insofar as possible. Construction schedules would be established which would least affect propagation of wildlife resources. The proposed structures at Houston are not expected to affect the environmental resources in other portions of the basin. The effects on water levels are discussed in paragraph 4.05.

4.03 The city of Houston receives its water supply from a groundwater source. Based upon preliminary technical information, this area in and around Houston is classified as a groundwater recharge area; however, any effects the proposed levee would have on the groundwater recharge would be negligible. The area behind the levee does not contribute significantly to the regional or local groundwater system.

4.04 The existing levees would be raised about 2½ feet on the upstream portion and approximately 4 feet on the downstream end. High flood barriers prohibiting access or disrupting community patterns were not proposed in locations where opposed by affected residents. Also, to provide a more pleasing visual appearance, the normal trapezoidal levee cross section would be widened at intervals. The increased levee height could result in some visual obstruction of the river. However, the levees would be placed back from the river and this impact should not be significant.

4.05 Water level computations indicate that for the 100-year flow, with either the existing or design conditions, the existing levees had no effect on water surface elevations upstream of the Highway 76 bridge or downstream of the county aid road bridge. Between the county aid road bridge and the Highway 76 bridge, the levees raised the 100-year profile by about 1.0 foot. For flows greater than the 100-year flow, the levees have an increasing effect on water surface elevations upstream but there is no effect downstream.

4.06 Increased noise, vehicle traffic, erosion, and possible air-borne dust could be anticipated during the actual construction phase of the project. These conditions are considered temporary; however, their short-term effects could be adverse to natural and human environments in the vicinity of the construction.

4.07 Economic feasibility and engineering practicability have been established for a local levee system at Houston which would reduce flood damages to floodplain developments in the community. Social and biological concerns were considered in selecting the proposed plan. The proposed plan provides the desired degree of protection to floodplain developments without undue adverse social or environmental impacts.

4.08 Floodplain regulation and flood insurance would be used to reduce flood damage at the other flood-prone communities of Whalen, Hokah, Preston, Peterson, Lanesboro, and rural areas.

4.09 Strict floodplain regulations do have some adverse effects. An example is the situation of owners of flood-prone property who want to sell or extensively repair or remodel property to increase its longevity and/or value. The flood hazard in Houston may make it somewhat difficult to sell a home or extend a loan for residential property. However, the primary consideration is the danger to which the property is exposed. The National Flood Insurance Program should ease this situation by providing insurance against the probable flood loss. Section 202(b) of the Flood Disaster Protection Act further clarifies the loan requirements.

4.10 Thus the initial effects of an effective floodplain zoning program would generally be adverse to those people owning flood-prone property. In addition to the financial hardships, the floodplain regulations would have social and aesthetic effects in those areas where developments were allowed to deteriorate to a point of uselessness before being torn down and the residents relocated. On the other hand, this alternative would primarily affect those individuals that have the flood problem and would not create extensive effects on the human or natural environment in some area removed from the problem area.

4.11 Floodplain regulation would eliminate non-conforming uses from the floodplain and would reduce damage caused by floods. Elimination of non-conforming uses is a long-term process, the results of which may not be apparent for several decades. Crop damages would be reduced only to the extent that farming is discouraged in the floodplain in the long term. Due to the highly productive and profitable nature of floodplain farming in the basin, no long-term shifts away from agricultural land use can be foreseen. Regulation of floodplain uses would also reduce the cost of other flood control structures which would have been needed to reduce flood damages. Also, floodplain regulation would keep the floodplain in a more biologically productive state instead of development for residential or industrial uses.

4.12 The National Flood Insurance Program was created to curb the continually increasing annual losses from flood damage and was intended to be an alternative to structural programs and a method of reducing direct Federal disaster relief. For structures already existing in the floodplain, a higher percentage of the premium is paid by the Federal Government. New structures, built after the effective date of a Flood Insurance Rate Map, would be insured at actuarial rates. Coverage can also be obtained on contents of the buildings, and higher coverage than prescribed by regulation is available at actuarial rates.

4.13 Although it does not prevent flood damages from occurring in the short term, flood insurance would assist property owners in recovering from flood damages. The payment of insurance premiums would in many cases be expensive,

in keeping with the degree of flood hazard and depending upon whether coverage were subsidized. In order to participate in the program, the local unit of government must adopt adequate floodplain regulations with effective enforcement consistent with Federal standards. Therfore, the floodplain regulation alternative must be a part of this plan. Incentive for participation in the program when constructing new structures is strong since flood insurance is required for Federal and federally related financial assistance for any building located in the intermediate regional floodplain.

4.14 The economic and social impacts for residents of the intermediate regional floodplain would be great under this plan since it would internalize the costs of floodplain development more than any other plan. The public not residing in the floodplain would experience the smallest adverse social and economic impacts with this plan. The small impacts for the larger public would be due to the nature of the program which, for example, does not allow Federal disaster relief for insured properties. This would reduce Federal costs to Federal subsidy of insurance payments until the existing structures in the intermediate regional floodplain became obsolete and were replaced, at which time Federal participation would theoretically end. Therefore, this plan could be very acceptable to the non-resident public.

4.15 The adverse environmental impacts of floodplain regulation should be minimal. This plan eliminates non-conforming uses and discourages developments in the floodplain in the long term. This would tend to favor floodplain biological systems. However, long-term shifts away from agricultural use of the floodplain are not expected; therefore, natural vegetation and wildlife would benefit to the extent that developments are regulated.

4.16 The mining of mineral resources should not be an incompatible floodplain use if certain conditions are adhered to, such as the proper disposal of spoil material. Current regulations and requirements should be obtained from the appropriate agencies before any mineral exploration takes place.

4.17 The impacts of the project on recreational rivers are not expected to be severe. The Root River Trail system is authorized but the location of the trail at Houston has not been determined. However, the levees could be used as part of the trail system. The proposed project is not expected to have any adverse impacts on the Minnesota Memorial Hardwood State Forest located in southeastern Minnesota. The city of Houston has developed plans for a park adjacent to town. The project is not expected to affect the proposed park.

4.18 Forty-eight prehistoric and historic sites were identified in the report entitled "Known Archaeological and Historical Resources in the Root River Basin" prepared by the State Archaeologist for the Corps of Engineers. None of these sites will be affected by the proposed project. Of the 3.1 miles of levee in the proposed project, 2.7 miles exist already, but will require upgrading. The 0.4 mile of new levee will require 2.5 acres of land along the floodplain, an area favored for prehistoric occupation. In addition to the levees, the drainage facilities and the borrow areas will be surveyed for unknown prehistoric, historic, and architectural resources during the Phase II planning stages. The locations of the borrow areas have not yet been determined. The area around Houston is primarily used for agriculture and grazing, so that archaeological remains may be relatively undisturbed.

5. UNAVOIDABLE ADVERSE IMPACTS OF THE PROPOSED ACTION

5.01 The unavoidable adverse impacts of the proposed plan include the loss of land required for levee construction or upgrading of existing levees. Construction would also cause dust and noise pollution plus increased vehicle traffic. Some negation of aesthetic qualities may also be associated with the structures.

5.02 The problems associated with floodplain regulation and flood insurance, such as difficulties in home improvements and land sale, would also be unavoidable. These problems were discussed in paragraphs 4.08 through 4.13

6. ALTERNATIVES TO THE PROPOSED ACTION

6.01 Various alternatives to the proposed plan have been studied during the formulation of the selected plan. Annual costs and benefits are based on an interest rate of 5 7/8 percent, price levels and conditions existing in July 1974, and a 100-year period of economic analysis.

6.02 Any alternatives considered should satisfy the following objectives.

a. Providing protection, prevention, reduction or compensation of flood losses for the flood-prone communities and rural areas of the basin.

b. Identifying erosion and sediment control programs available for the portions of the basin not presently participating in an established program.

c. Identifying a water quality management plan for abatement of the sources of pollution in the basin.

Additional constraints and considerations used in the decision making process include:

a. Developing a plan which is responsive to the people's desires and needs and is acceptable to the local sponsor.

b. Enhancing the social well-being and environmental quality of the basin.

c. Protection from a 100-year flood for all urban alternatives evaluated as required by State standards.

6.03 Various nonstructural and structural measures could reduce the potential for flood damage in the Root River basin. Nonstructural alternatives include: no action, flood warning and forecasting service; permanent floodplain evacuation and flood-proofing; and flood insurance and floodplain regulation. Structural alternatives are: levees, channel

modifications, snagging and clearing, and upstream reservoirs. Alternatives for reducing flood damages are first considered for the flood-prone communities of Hokah, Houston, Whalen, Peterson, Lanesboro, and Preston, and second to solve both the urban and rural flood problems of the basin. Since upstream reservoirs would be considered as a flood damage reduction alternative for each flood-prone community and for rural flood-prone areas, the discussion of this alternative is presented only under the basin alternative section. All urban flood control alternatives except the rural channel modifications are evaluated based on providing protection against a 100-year flood.

FLOOD CONTROL ALTERNATIVES FOR HOKAH, WHALEN, PETERSON, LANESBORO, AND PRESTON

6.04 The proposed plan for reducing flood damages at these locations would include floodplain regulation and flood insurance as discussed in paragraphs 1.08-1.13. Alternatives considered to the proposed plan were nonstructural and structural and included: no action, flood warning and forecasting services, floodplain evacuation and floodproofing, and levees, as described in the following paragraphs.

NO ACTION

6.05 If no flood protection plan was initiated it would not solve flood problems since periodic flooding and associated damages would occur as in the past. Consideration was given to recommending that no action be taken to alleviate the flood problems. However, based upon current Federal and State policies, these towns will be required to adopt, enforce, and administer sound floodplain management ordinances and be eligible to participate in the flood insurance program. Therefore, the no action program at minimum is one of floodplain regulation and flood insurance and has similar benefit-cost ratios as indicated in paragraph 1.08. Nevertheless, recurring flood hazards would continue to threaten the health, public safety, and social well-being of the people for a number of years. The impacts of floodplain regulation and flood insurance are described in section 4. Land use plans and results of future developments are presented in section 3.

FLOOD WARNING AND FORECASTING SERVICES

6.06 Flood warning would consist of reasonably predicting the time and magnitude of a flood and evacuating the flood prone areas or erecting emergency flood protection measures. The flood warning and forecasting service for the Root River basin is provided by the National Weather Service Forecast Office located in Minneapolis, Minnesota. Daily stage reading and, when appropriate, crest forecasts are available at that office for dissemination to the general public through Associated Press and United Press wires or via Southern Minnesota local weather wires and telephone to newspapers, radio and television stations, the State's Division of Emergency Services and the St. Paul District Corps of Engineers. In general, warnings of flood stages and crest forecasts are provided 24 to 36 hours in advance; however, the warning time varies

depending on the intensity, duration, distribution pattern, and time of occurrence of rainfall and antecedent rainfall. These time limitations also would probably not permit construction of emergency flood protection works.

6.07 In the case of snowmelt flooding, accurate assessment of the potential may precede actual runoff by several weeks. At Hokah, when river stages are expected to exceed 47 feet, residents are notified by the Weather Service through the news media. Provided this amount of time, emergency protection works could be built at Hokah. Emergency protection may be adequate for smaller floods; however, floods of larger magnitude would create structural stability problems due to hasty construction and increase the danger of failure, with resultant hazard to public safety. These measures would continually disrupt the biological systems and scenic quality of the flood prone areas. Also, these measures would cause much personal inconvenience and continual community disruption to residents. Therefore, flood warning and forecasting service is not considered socially, economically, or biologically acceptable as a total solution to the flood problems. However, this alternative could be used as a supplement to either nonstructural or structural measures.

FLOODPLAIN EVACUATION AND FLOOD PROOFING

6.08 Permanent evacuation of developed floodplain areas involves acquisition of lands by purchase, removal and relocation of improvements, evacuation and resettlement of population, and permanent conversion of lands to uses less susceptible to flood damage. Lands acquired in this manner could be used for agriculture, parks, or other purposes which would not interfere with, or sustain excessive damages from, flood flows. Flood proofing would consist of a combination of structural changes and adjustments to properties subject to flooding. Although best applied to new construction, it is also applicable in certain instances to existing facilities. The depth of flooding is used to determine if either evacuation or flood proofing of the identified flood prone buildings is warrented. All buildings which have less than 2 feet of flooding at the groundline from the 100-year flood, would be flood proofed. All other flood prone buildings would be evacuated. Care would have to be taken to assure that the residences and businesses to be flood proofed would not become isolated during major floods.

6.09 This alternative could immediately and permanently control major damage from the 100-year flood as long as appropriate floodplain regulations were adopted for the lands evacuated. Movement out of the floodplain would result in habitat improvement in some evacuated areas.

6.10 Personal inconveniences would be considerable but would be offset to greater or lesser extent by the elimination of inconvenience from periodic flooding. This alternative would be unacceptable to many residents with strong ties to their present homes and community. Individuals with investments in local businesses and real estate which might suffer from a relocation would also oppose evacuation. However, relocation onto uplands might be accomplished in such a manner as to result in a community which could be very desirable to live in and one

which might be in harmony with environmental features. This plan has a benefit-cost ratio of 0.7, 0.3, 0.4, 0.2, and 0.2 for the towns of Hokah, Whalan, Peterson, Lanesboro, and Preston, respectively.

6.11 Ecologically, this alternative is acceptable, as the biological systems in the floodplain would probably become more productive and/or diverse. Debris from evacuation would leave a long-term scar on the floodplain; however, much of the material could be recycled or disposed of properly. Relocation of existing families and businesses would also require that the relocation site be subjected to disturbances, clearing of vegetation, and permanent disruption of existing ecological relationships.

LEVEES

6.12 For the town of Hokah, one alternative includes a system of levees, road raises, levee and culvert crossing of Thompson Creek, and appropriate interior drainage facilities to provide protection for the flood prone areas of Hokah along the Root River. This alternative consists of a road raise and levee west of Highway 16 and a levee and culvert east of Highway 16. The levee would be an earth embankment, and the culvert over Thompson Creek would be designed to control creek flows. This alternative would not constrict the natural river channel.

6.13 Construction of the levees and road raises would alter some natural vegetation. Landscaping and tree and shrub planting could be included as alternative features to partially offset these habitat losses. In addition to plantings, irregular slopes incorporated into the levee side slopes could aesthetically improve their appearance.

6.14 Average annual costs would outweigh the average annual benefits, making this alternative economically infeasible for Hokah, as well as for the other communities except Houston. The levee plan for the towns of Hokah, Whalan, Peterson, Lanesboro, and Preston has a benefit-cost ratio of 0.4, 0.1, 0.7, 0.2, and 0.1, respectively.

FLOOD CONTROL ALTERNATIVES FOR HOUSTON

6.15 The proposed plan for Houston provides for 3.1 miles of levees and 0.2 mile of road raises. The structural features are discussed in paragraph 1.03.

6.16 Alternative nonstructural plans considered for reducing flood damages at Houston included no action, floodplain evacuation and flood proofing, and floodplain regulation and flood insurance. These would be comparable in description, in social and biological effects and in economic feasibility to the similar alternatives identified for the other towns. Also, flood warning and forecasting services at Houston would be similar to that described for the other towns, except that at Houston, residents are affected when the Root River stage exceeds 15 feet on the gage below the South Fork Root River. Individual homeowners are notified of anticipated flooding by the local radio as well as by the police and sheriff's departments using mobile public

address systems. All of the above alternatives for Houston compare in close detail to the alternatives described for the other towns (see paragraph 6.04 to 6.11) and are either economically infeasible or socially unacceptable or both. Therefore, only a levee plan is considered to be a solution to Houston's flood problems. The alternatives of floodplain evacuation and flood proofing or floodplain regulation and flood insurance have benefit-cost ratios of 0.8 and 0.9 respectively.

FLOOD CONTROL ALTERNATIVES FOR RURAL AREAS

6.17 The proposed plan encourages floodplain regulation and flood insurance for rural areas of the basin. Alternatives considered were channel modifications and levees, upstream reservoirs, snagging and clearing, and nonstructural alternatives.

CHANNEL MODIFICATIONS AND LEVEES

6.18 It would be impractical to consider channel modifications alone because of the relatively flat slopes of the lower portion of the Root River. Therefore, this alternative consists of a combination of channel modifications and levees for the rural flood prone areas of the Root River main stem from the confluence of the South Branch to State Highway 26 downstream from Hokah, a distance of 55 miles. The channel would require varying degrees of modification to contain the 10-percent design flow. In many areas flanking levees would be required at various heights to contain the design flow. This alternative would severely disrupt the environment of the river corridor throughout the lower basin. Although there would be moderate reduction of rural flood damages, rural channel modifications and supplemental levees are not economically feasible (benefit-cost ratio of 0.1).

UPSTREAM RESERVOIRS

6.19 Upstream reservoir storage was investigated at varying locations on the South Fork, South Branch, and Root River main stem. Each site investigated had different degrees of capability in meeting downstream flood reduction needs, and also different degrees of impact on the environment and residents in the reservoir areas. Since discussions regarding all the reservoir alternatives would be similar, the only reservoir plan presented will be the one that provides the greatest amount of downstream flood damage reduction for urban and rural areas. This alternative consists of a reservoir on the main stem above the confluence of the South Branch near the abandoned power dam near Lanesboro and a second reservoir on the South Branch above Preston. The two reservoirs as a system would control 762 square miles of drainage area and would provide a high degree of flood protection for urban and rural areas along the Root River main stem.

6.20 Detailed studies made in the mid-to-late 1960's indicated that both the Lanesboro and Preston reservoirs could be economically justified. However, because of increasing construction costs, the increasing Federal discount rate, and greater concern for the environment, this alternative either alone or in combination with other potential projects lacks feasibility (benefit-cost ratio of 0.5).

SNAGGING AND CLEARING

6.21 This alternative would consist of snagging and clearing of about 40 miles of the Root River from about Lanesboro to State Highway 26 downstream from Hokah. Preliminary study results show that snagging and clearing would not significantly increase channel capacities and thus would only slightly reduce flood damages in the agriculturally oriented basin. In addition, snagging and clearing projects would not be economically feasible (benefit-cost ratio of 0.2). Snagging and clearing would be preferable to channelization or rural levees with regard to expected ecological impact.

NONSTRUCTURAL ALTERNATIVES

6.22 The non-structural alternatives for rural areas of the basin are similar to the descriptions given for the flood prone communities as presented in paragraphs 6.05 to 6.11.

6.23 Floodplain evacuation would involve the relocation of existing farmsteads, facilities, and stored crops, but not the conversion of cropland from agricultural land use to other land uses. Floodplain evacuation is unacceptable to local interests, and it may disrupt the rural community cohesion and sociological ties.

ALTERNATIVES FOR EROSION AND SEDIMENT CONTROL

6.24 A definite need exists for controlling soil erosion in the headwater and streambank areas and reducing sedimentation in the downstream channels and floodplain areas. This statement identifies various alternatives for given erosion problems. These programs include the Resource Conservation and Development (RC and D) Program, Rural Environmental Conservation Program (RECP), and the small watershed program authorized under P.L. 566. The above programs are all administered by the Soil Conservation Service (SCS). Also, the Corps of Engineers and the SCS can provide technical assistance or advice to local governmental units for a specific soil erosion problem. The Hiawatha Valley RC & D Project, which includes the Root River basin, was recently authorized for planning and a preliminary report has already been completed. The Root River Basin Citizens Advisory Committee encourages individuals to use good farming practices whenever possible to prevent soil erosion and water pollution. The SCS does recommend a number of general types of structural and nonstructural land treatment practices that are effective in reducing soil loss and erosion (figure 13). Some of the most commonly recommended conservation land treatment measures include: contour farming, stripcropping, minimum tillage, grassed waterways, terraces, diversions, streambank protection, water control structures, controlled grazing and livestock exclusion. Systems of conservation practices can be effective in controlling excessive erosion and reducing runoff. Improving erosion and sediment controls is an important basin need. The SCS and the Southern Minnesota River Basin Commission are expected to identify and consider more specific alternatives for solving this problem in their type IV comprehensive study. Also, a preliminary analysis of various SCS-sized reservoirs, and their effects on controlling flooding is presented in the feasibility report.

Figure 13 - Recommended Structural and Nonstructural Land Treatment Practices for Counties in the Root River Basin (1)

Recommended Practices	Root River Basin by Counties					
	Houston	Fillmore	Mower	Winona	Olmsted	Dodge(2)
Strip cropping	X	X	X	X	X	X
Mulch tillage	X	X	X	X	X	X
Contour farming	X	X	X	X	X	
Streambank protection	X	X		X	X	
Stabilization structures	X	X		X	X	
Regulated grazing	X	X		X	X	
Conservation practices	X	X		X	X	
Prevent grazing	X	X		X	X	

(1) Information obtained from the Soil Conservation Service
(2) Information supplied by U.S. Department of Agriculture

7. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

7.01 Short-term benefits would consist of avoidance of adverse economic and social impacts of floods equal to, or of less magnitude than, the intermediate regional flood.

7.02 Extended and expanded occupation of the floodplain would impair the natural high productivity of the floodplain area involved. This would be traded for short-term economic and social gain.

8. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION

8.01 Natural systems displaced by project structures would be essentially irretrievable. The additional land needed for levee construction would also be lost for other uses. For practical purposes the natural resources used in building the structures would also be irretrievable. In the case of Houston, there would also be a commitment to continuing and increasing development in the floodplain.

8.02 Intensive floodplain management programs are a long-term commitment to compatible uses of the floodway.

9. COORDINATION

9.01 Coordination with Federal and State agencies, elected officials, citizen groups and interested individuals was initiated in the early stages of investigation for the proposed project. In September 1973, an Agency Advisory Committee was established. This committee is composed of representatives of the Soil Conservation Service, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, U.S. Geological Survey, Bureau of Outdoor Recreation, Minnesota Department of Natural Resources (four divisions), Minnesota Pollution Control Agency, and the Southern Minnesota Rivers Basin Commission. This committee is designed to help create a one-to-one working relationship between the Corps of Engineers and each agency, and effectively improves the coordination and input from all concerned agencies as the study progresses. This committee is kept fully informed of the study by regular correspondence which includes invitations to attend all Citizen Advisory Committee meetings, memos on all meetings, and memos on any field reconnaissance.

9.02 A Citizens Advisory Committee was established by the Southern Minnesota Rivers Basin Commission at a meeting held on 29 November 1973 in Rushford, Minnesota, to assure that the public is actively and effectively involved in the Root River basin feasibility study. The committee has 21 members, consisting of mayors, county commissioners, Soil and Water Conservation District personnel, environmentalists, farmers, and concerned citizens. Since the initial meeting the committee has met on a regular basis. Besides sending letters to each member before the meetings, the committee prepares a newspaper article (which is published in 13 area newspapers) discussing the itinerary of the meeting and inviting the general public to attend these meetings. After each meeting an article discussing the results of the meeting is again placed in the newspapers. In addition to the already identified publicity, some area newspapers have written several special articles regarding this feasibility study. Generally, the committee meetings involve not only the committee members, but as many as 6 different agencies and up to 40 interested citizens. All meetings have included informative discussions between persons attending and attempt to help the Corps develop a complete public involvement program. The Corps participated in all meetings, and the Citizens Advisory Committee has requested that the Minnesota Department of Natural Resources, the Soil Conservation Service, the Minnesota Pollution Control Agency, and the Southern Minnesota Rivers Basin Commission make individual presentations.

9.03 Copies of the draft statement were furnished to the following for comment:

U.S. Environmental Protection Agency
U.S. Department of Agriculture
U.S. Department of Commerce
U.S. Department of Health, Education and Welfare
U.S. Department of Housing and Urban Development
U.S. Department of the Interior
U.S. Department of Transportation

Upper Mississippi River Basin Commission
Minnesota Department of Agriculture
Minnesota Department of Economic Development
Minnesota Department of Health
Minnesota Department of Natural Resources
Minnesota Environmental Quality Council
Minnesota Highway Department
Minnesota Pollution Control Agency
Minnesota Resource Commission
Minnesota State Archeologist
Minnesota State Historical Society
Minnesota State Park Commission
Minnesota State Planning Agency
Minnesota Water Resources Board
Southern Minnesota Rivers Basin Commission
Mayor, Houston, Minnesota
Citizens Advisory Committee, Environmental Quality Council
Friends of the Earth, Minnesota Branch
Izaak Walton League of America, Minnesota Division
Minnesota Conservation Federation
Minnesota Environmental Control Citizens Association
Minnesota Public Interest Research Group
National Audubon Society, North Midwest Regional Office
The Nature Conservancy, Minnesota Chapter
Sierra Club, North Star Chapter
Soil Conservation Society of America, Minnesota Chapter
Minnesota Educational Association, Environmental Task Force
Minnesota Environmental Steering Committee, Minnesota Department of Education
Minnesota Environmental Education and Research Association, St. Paul
Minnesota Environmental Education Council
Root River Basin Citizens Advisory Committee

9.04 In addition, copies of the draft statement were furnished to the following libraries where they were available for review:

Public Library
Caledonia, Minnesota 55921

Public Library
Chatfield, Minnesota 55923

Public Library
Harmony, Minnesota 55939

Public Library
Preston, Minnesota 55965

Public Library
Broadway at First Street SE
Rochester, Minnesota 55901

Public Library
Spring Valley, Minnesota 55975

Public Library
Stewartville, Minnesota 55976

9.05 Comments on the draft statement were received from the following:

U.S. Environmental Protection Agency
U.S. Department of Agriculture
  Forest Service
  Soil Conservation Service
U.S. Department of Health, Education and Welfare
U.S. Department of the Interior
  Bureau of Indian Affairs
  Bureau of Mines
  Bureau of Outdoor Recreation
  Fish and Wildlife Service
  National Park Service
  Geological Survey
U.S. Department of Transportation
  Federal Highway Administration
  U.S. Coast Guard
Minnesota Historical Society
State of Minnesota, State Planning Agency
State of Minnesota, Department of Agriculture
State of Minnesota, Department of Highways
Sierra Club

9.06 Comments on the revised draft statement were received from the following:

U.S. Environmental Protection Agency
U.S. Department of Agriculture
U.S. Department of Housing and Urban Development
U.S. Department of the Interior
U.S. Department of Transportation
  U.S. Coast Guard
State of Minnesota, Department of Natural Resources

9.07 The ensuing pages consist of the letters of comment and the Corps responses.

LETTERS of COMMENT and CORPS RESPONSES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

APR 23 1975

Colonel Max W. Nash
District Engineer
U. S. Army Engineer District, St. Paul
1135 U. S. Post Office & Customhouse
St. Paul, Minnesota 55101

Dear Colonel Nash:

We have completed our review of the Draft Environmental Impact Statement (EIS) and Draft Feasibility Report for Flood Control for the Root River Basin which was submitted to us on February 26, 1975. We have classified our comments as Category LO-2. Specifically, we have no major objections to the implementation of Flood Control Plan. However, we believe additional information should be provided concerning the effects of this project on the proposed Root River Trail and the Memorial Hardwood State Forest. This letter constitutes our comments on both the EIS and the feasibility report. The date and classification of our comments will be published in the Federal Register in accordance with our responsibilities to inform the public of our views concerning other Federal Agency's proposals. The following comments are for your consideration in preparing the Final EIS and Final Feasibility Report.

A discussion of other related projects and land use plans in the watershed which will affect or be affected by the proposed project should be included in the Environmental Impact Statement. This project's interrelationship and general environmental impact on the authorized Root River Trail and the Minnesota Memorial Hardwood State Forest should be discussed.

It was noted in the EIS that other flood control projects have been implemented or are being planned in the Root River basin. These projects include the Rushwood Levee System, the Preston Soil Conservation Service Pilot Project, the Rushford-Pine Creek Soil Conservation Project, the 1916 Judicial Ditch Number One, and the Thompson Valley project near Hokah. The environmental effects of gradual encroachment on flood plain land can be as severe as a single large project. Therefore, the combined environmental effect of all these projects should be addressed.

In Section 3.03 of the EIS, it was stated that increased commercial and residential expansion is expected as a result of the proposal. It should be noted that with this greater commercial and residential expansion a failure of the levee system would cause even greater flood damage. The

Corps responses to the U.S. ENVIRONMENTAL PROTECTION AGENCY

1. A discussion of land use plans as related to the project has been included in section 3 and paragraphs 2.68 and 2.79-2.82. No definite plans have been developed to date for the location of the Root River trail through Houston, Minnesota. The Department of Natural Resources has indicated that the levees could be used as a portion of the trail in Houston. The project, as described, should not have any adverse impacts on the Minnesota Memorial Hardwood State Forest.

2. The projects listed in the EIS in sections 2.79 through 2.82 are in various stages. Some are constructed, others are in the early planning stages, and some have been discontinued. These projects together have significant environmental effect, but not all are Corps projects nor are they functionally related to the subject of this document. Their effects have, therefore, not been discussed.

3. Expansion is expected with or without the proposed project. By 2030 approximately 90 additional acres will be developed in the Houston area with an estimated division as follows: 55 acres residential, 11 acres commercial, 8 acres public and semipublic, and 16 acres streets. It is estimated that use of the floodplain will be similar at 2030 conditions with or without project protection. Property owners in Special Flood Hazard Areas must obtain flood insurance coverage to qualify for new mortgages, home improvement loans, or disaster assistance loans. Over a long period of time virtually all homes and businesses subject to flood damage will be covered. Additional information on land use is described in Section 3 and estimated future flood damages without the project are presented in figure 10.

EIS should discuss the possibilities of such an occurrance. Furthermore, the amount of additional development in natural flood plain areas should be discussed.

As shown in Figure 5 of the EIS, the water quality of the Root River does contain relatively high amounts of total coliform bacteria, BOD, suspended solids, and turbidity. One contributing factor for these relatively high values would be the wastewater discharges from the sewage treatment plants from the cities along the Root River. The cities of Hokah, Houston, Lanesboro, Peterson, Preston, and Rushford, plus other smaller municipalities all discharge wastewater to the Root River. The EIS should discuss how these higher amounts of bacteria, BOD, suspended solids and turbidity will affect the aquatic environment and recreation of the Root River.

We appreciate the opportunity to review this Draft EIS and Feasibility Report. When the Final EIS is filed with the Council on Environmental Quality, please forward three copies to us.

Sincerely yours,

Gary A. Williams

for Donald A. Wallgren
Chief,
Federal Activities Branch

Corps responses to the U.S. ENVIRONMENTAL PROTECTION AGENCY (continued)

4. The proposed project would not affect the sewage treatment facilities of any communities in the basin. The Minnesota Pollution Control Agency has prepared a Segment Plan for the Root River and has developed water quality standards for the basin. The communities have constructed or are constructing sewage treatment facilities which will meet State standards.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA. 19082

215-597-3772

8400
April 21, 1975

Colonel Max W. Rosh
District Engineer, St. Paul District
Corps of Engineers
1135 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

Re: NCSED-SR, Draft Environmental Statement, Flood Control Root River Basin, Minn.

Dear Col. Rosh:

The above statement gives a thorough and complete analysis of the environmental effects of the Root River Project. The discussion of land use plans, including floodplain regulations, is a good example of long-term planning that will greatly increase the value of flood protection.

The section on erosion and sedimentation shows woodland as one of the major sediment sources. We take exception to that statement. Wild woodlands or properly managed woodlands contribute little to erosion. The final statement should clarify this point by indicating any additional uses, such as over-grazing , that would tend to cause erosion from the woodlands, or delete reference to woodlands as a primary source of sediment production.

Thank you for the opportunity to comment on this statement.

Sincerely,

DALE O. VANDEBURG
Group Leader
Environmental Improvement
Environmental Protection & Improvement

Corps responses to U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE

5. The references to woodland as a source of sediment on page 30 of the draft EIS has been deleted. (See page 29, revised draft statement). Also, the term "major" in "major source" has been deleted. However, woodlands, admittedly a minor source of sediment, can be a source due to over-grazing, or other poor land use practices, or topographic position.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
316 North Robert Street, St. Paul, Minnesota 55101

April 8, 1975

Col. Max Noah, District Engineer
Corps of Engineers
Room 1135, U. S. Post Office and Custom House
St. Paul, Minnesota 55101

Dear Col. Noah:

The draft environmental impact statement for Flood Control, Root River Basin, in Houston, Fillmore, Mower, Winona, Olmsted and Dodge Counties, Minnesota was addressed to the Soil Conservation Service in St. Paul, Minnesota on February 26, 1975 for review and comment.

We have attached for your consideration some comments in the preparation of the revised draft environmental impact statement.

We would appreciate receiving two copies of the revised draft environmental impact statement.

We appreciate the opportunity to review and comment on the proposed project.

Sincerely,

Harry H. Major
State Conservationist

Attachment

DRAFT ENVIRONMENTAL IMPACT STATEMENT
FLOOD CONTROL ROOT RIVER BASIN
MINNESOTA
1975

COMMENTS

1. Page 9, paragraph 2.16, second sentence, suggested rewrite:

This material, called loess, was carried by great dust storms from the "Mississippi River bottomland" during glacial interludes.

2. Page 13, paragraph 2.34, last sentence, suggested rewrite:

Most of these changes occurred prior to 1960.

3. Pages 21-24:

The tables (Figures 6, 7, 8 and 9) would be more complete if the source of data was noted.

4. Pages 31 and 32, paragraph 2.78, delete last two sentences:

Insert "Applications for PL 83-566 assistance has been made to and approved by the state soil and water conservation commission for the Thompson Valley Watershed near Hokah, South Fork Root River Watershed and Beaver Creek Watershed. However, because of the lack of local support, the applications have been returned to the sponsors on the South Fork Root River Watershed and Beaver Creek Watershed.

5. Page 33, paragraph 4.02:

We would encourage to use native species of grass, trees and shrubs to revegetate the disturbed areas.

6. Page 40, paragraph 6.20:

There is confusion in this paragraph relative to the feasibility of the reservoirs. Does the 0.5:1 benefit cost ratio apply to the studies made in the mid to late 1960's or the more recent studies. Possibly the 0.5:1 benefit cost ratio should be shown after the second sentence.

7. Pages 40 and 41, paragraph 6.24, line 10:

Suggest deleting sentence starting with "It could be several years before an RC&D Program ----" Insert "The Hiawatha Valley RC&D Project was recently authorized for planning. The Root River Basin Citizens Advisory Committee encourages individuals to use good farming practices whenever possible."

Corps responses to U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

6. The statement concerning the source of the loess material has been deleted. The loess deposits of southeastern Minnesota probably came from the margins of the glaciers as they advanced and retreated. These silt-sized deposits, primarily from the Des Moines Lobe of the Wisconsin glaciation, were then carried eastward by the wind. The material from the Mississippi River bottomland would be deposited mainly to the east in Wisconsin and Illinois. (see paragraph 2.16).

7. The change has been made, see paragraph 2.36.

8. The sources for these tables have been identified. Most of the tables were prepared by the St. Paul District, Corps of Engineers.

9. The Statement has been changed as suggested, see paragraph 2.80.

10. Native vegetation is increasingly being used for District landscaping purposes, and it will be strongly considered in this case.

11. The benefit/cost ratio refers to the most recent feasibility study and has been moved to make this clearer. See page 40.

12. The change has been made; see paragraph 6.24, revised draft.

8. Line 13

Suggest deleting sentence starting with "The SCS has initially recommended certain general types —— through Table 15." Insert "The SCS does recommend a number of general types of structural and non-structural land treatment practices that are effective in reducing soil loss and erosion. Some of the most commonly recommended conservation land treatment measures include: contour farming, stripcropping, minimum tillage, grassed waterways, terraces, diversions, streambank protection, water control structures, control grazing and livestock exclusion. All of these conservation practices, either singly or in a combination can adequately treat the land to reduce the rate of runoff and erosion.

Corps responses to U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE (continued)

13. The changes have been made, see page 41.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE CENTRAL REGION
Room 1836
601 East 12th Street
Kansas City, Missouri 64106

March 25, 1975

WFC2x2

District Engineer
Corps of Engineers
1135 U. S. Post Office and
Custom House
St. Paul, MN 55101

Subject: Draft Environmental Impact Statement for Flood Control - Root River Basin, Minnesota

Reference: NCSED-ER, February 26, 1975

Dear Sir:

Reference is made to your letter which transmitted a copy of the Draft Environmental Impact Statement for the Root River Basin, Minnesota, and requested our comments.

In accordance with agency policy, the Draft has been forwarded to our Washington Headquarters for review and comments as necessary.

Sincerely,

Elroy C. Balke
Regional Hydrologist

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGION V
300 SOUTH WACKER DRIVE
CHICAGO, ILLINOIS 60606

OFFICE OF
THE REGIONAL DIRECTOR

March 25, 1975

Mr. Max W. Hoah
Colonel, Corps of Engineers
District Engineer
Department of the Army
1210 U.S. Post Office and Custom House
St. Paul, Minnesota 55101

RE: Draft Environmental Impact Statement
Flood Control
Root River Basin
Houston, Fillmore, Mower, Winona, Olmsted and Dodge Counties,
Minnesota

Dear Mr. Hoah:

We have reviewed the Draft Environmental Impact Statement for the above project. To our knowledge, and based upon the information provided, this project will not impact to any significant degree on the health, education or welfare of the population.

Sincerely yours,

Robert A. Ford

Robert A. Ford
Regional Environmental Officer

cc: Charles Custard, OEA
Warren Muir, CEQ

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

MINNEAPOLIS AREA OFFICE
831 SECOND AVENUE SOUTH
MINNEAPOLIS, MINNESOTA 55402

IN REPLY REFER TO:
Land Operations
EQ (75/192)

MAR 21 1975

Colonel Max W. Hoeh
District Engineer
St. Paul District, Corps of Engineers
1210 U. S. Post Office and Custom House
St. Paul, Minnesota 55101

Dear Colonel Hoeh:

Our office has reviewed the draft environmental impact statement for Flood Control, Root River Basin, Houston, Fillmore, Mower, Winona, Olmstead, and Dodge Counties, Minnesota.

There does not appear to be any Indian trust lands or interests that would be adversely affected by the project.

Sincerely,

Acting Area Director

United States Department of the Interior

BUREAU OF MINES

BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

Office of Chief

Intermountain Field Operation Center

April 16, 1975

Your reference:
NCSED-ER

Colonel Max W. Noah
District Engineer, St. Paul District
U.S. Army Corps of Engineers
1135 U.S. Post Office and Custom House
St. Paul, Minnesota 55101

Dear Colonel Noah:

We have reviewed the Corps' draft environmental impact statement dated February 1975 for flood control in the Root River basin, southeastern Minnesota (ER-75/192), as requested on March 4 by the Director, Office of Environmental Project Review, Department of the Interior.

55

Our informal, field-level comments are offered as technical assistance regarding environmental impacts within our sphere of expertise: involvement of mineral resources or mineral-production operations. They do not constitute a final project review by the Bureau of Mines because the proposal will require new authorization.

The Root River drains 1,660 square miles, including most of Fillmore and Houston, and parts of Dodge, Mower, Olmsted, and Winona Counties. To reduce flood damage in the watershed, 3.1 miles of levees and 0.2 mile of road raises are proposed at Houston, Minn., and flood-plain regulation and flood insurance are proposed for other flood-prone areas. Thus, the proposed action would affect only a part of the basin, the flood plain of the Root River downstream from Preston. Figure 1 shows the approximate area that would be involved, but this flood-prone area should be illustrated in more detail for it is the area of environmental impact. These nonstructural measures for flood control are, we believe, a refreshing change from the frequent approach to "dam it."

Summaries concerning several components of the environment are included in the statement, and a section is devoted to geology (para. 2.15 to 2.20). However, mineral resources, another important part of the environment, are not mentioned. A summary paragraph about mineral resources, such as the following one, should be added to the statement.

Corps responses to U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF MINES

14. The major environmental impact would occur at Houston where the levees are proposed. Therefore, a more detailed map of this area is presented (see plate 1) A more detailed map of the selected plan for the basin is also presented in the revised draft EIS (see plate 2).

15. Your suggested revision concerning mineral resources has been incorporated into the revised draft statement, see paragraph 2.19.

Identified mineral resources in the basin are stone (limestone), sand and gravel, and iron ore. Since the mining of iron ores in the Spring Valley district ceased in 1968, the production of limestone and sand and gravel, from quarries and pits in each of the six counties, has been modest but steady (U.S. BuMines Minerals Yearbooks). The commodities are produced from operations both within and outside the flood plain. Other mineral resources, now subeconomic or undiscovered, may occur in the basin also. For example, Zietz reports a strong, cigar-shaped magnetic anomaly approximately between Lanesboro and Peterson ("A magnetic anomaly of possible economic significance in southeastern Minnesota," U.S. Geol. Survey Circ. 489, 1964); subsequent drilling revealed the cause: a body of titaniferous magnetite at a depth of about 800 feet (Sims, P. K. "Magnetic data and regional magnetic patterns," in Geology of Minnesota: A Centennial Volume. Minn. Geol. Survey, 1972, p. 592).

Paragraphs 4.06 through 4.11 of the statement describe, in a general way, the effect of flood-plain regulation on resources and activities in the flood-prone area, but the impact of such regulations on mineral resources or operations is not clear. Yet this impact should be addressed specifically because of the several mineral-related activities in the flood plain. Topographic maps of the area show three sandpits northeast of Lanesboro, three gravel pits southwest of Peterson, a quarry just outside Lanesboro and another 3 miles north on the main stem, and two quarries midway between Houston and Rushford; these operations, and the magnetite body noted above as well, all appear to be within or to border the area that would be affected.

Actually, mineral-related activities would seem to us to be largely compatible with the measures proposed for flood control. However, if activities associated with exploration, development, or production of mineral resources would conflict with regulation of the flood plain, as proposed, our office review indicates that mineral resources and operations would be adversely affected. Therefore, we recommend that the effect of proposed regulations on mineral resources and operations be assessed and discussed in a revised environmental statement.

Sincerely yours,

H. C. Stewart, Acting Chief,
Intermountain Field Operation Center

Corps responses to U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF MINES (continued)

16. The mining of mineral resources would not be an incompatible floodplain use and would be permitted and acceptable if certain conditions were adhered to such as: the spoil material should be disposed of outside of the floodplain so floodwaters would not carry pollutants into the river; the mining operations should be carried out in such a way so as not to obstruct floodwaters or constrict the floodplain; and, the mining of mineral resources should not affect the aesthetic quality of the area. The above does not include any permits which may be required or regulations which have to be followed before the mining of mineral resources is conducted.

17. Floodplain Regulations state that Local Zoning Ordinances would permit uses having a low flood damages potential including certain sand and gravel operations. According to Minnesota State Regulations as stated in the Rules and Regulations of the Minnesota Environmental Quality Council (1974) an Environmental Assessment must be prepared for "Any industrial, commercial, or residential development of 40 or more acres within a floodplain area, as defined by the Statewide Standards and Criteria for Management of Floodplain Areas of Minnesota;" or for the "Construction or opening of a facility for mining gravel or other non-metallic minerals involving more than 320 acres." Each specific case of mineral resource exploration or development would have to be analyzed separately for their desirability in terms of the overall public interests. A statement concerning the compatibility of mineral exploration has been added to the revised draft in paragraph 4.16

United States Department of the Interior

BUREAU OF OUTDOOR RECREATION
LAKE CENTRAL REGION
1951 RESEARCH PARK DRIVE
ANN ARBOR MICHIGAN 48104

IN REPLY REFER TO:
D6427 UM
Root River
ER 75/192

April 16, 1975

Colonel Max W. Noah
District Engineer
U. S. Army Engineer District,
St. Paul
1210 U. S. Post Office and Custom House
St. Paul, Minnesota 55101

Dear Colonel Noah:

This is in response to your request for comments on the draft environmental impact statement (EIS) on Flood Control in Root River Basin, Minnesota (ER 75/192). Please note that, since the proposed project will require new authorization, the Department of the Interior will comment at a later date to the Chief of Engineers.

57

EIS Comments

2. ENVIRONMENTAL SETTING WITHOUT THE PROJECT

We suggest the final EIS indicate the State's Root River Trail is authorized for development along the river. It may be advisable to design the Root River levees so that a portion of the trail could be constructed on top of them. The Minnesota Department of Transportation can provide technical assistance in this regard.

3. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

The statement is made in paragraph 3.03 on page 33 that the levees constructed under this project would make possible additional commercial and residential developments in the Houston, Minnesota, area. We suggest the final EIS discuss the anticipated effects of these secondary environmental impacts on the wildlife habitat and recreation resources of the area behind the levees.

Sincerely yours,

JOHN D. CHERRY
Regional Director

By: Frederick J. Bender
Frederick J. Bender
Acting

Corps responses to U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF OUTDOOR RECREATION

18. The Root River Trail is in the planning stages. The trail, as proposed, is to start at Chatfield and follow the Root River to Hokah. The location of the trail has not been determined for the Houston area but the tops of the levees may be feasible and desirable for a trail. The levees, as planned, are wide enough for the trail. See paragraph 2.68 revised draft FIS.

19. Although additional developments are anticipated, with or without the project, they are not expected to be extensive or widespread. These developments would occur on agricultural land and possibly in some wooded areas. The expansion into the woodland would result in the loss of wildlife habitat. Approximately 90 acres at Houston will be developed between 1980 and 2030, about 8 acres of which would be for public or semipublic uses. It is impossible to discuss the impacts resulting from future developments with any degree of certainty because the exact location of developments is not known.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

IN REPLY REFER TO
ES-FWP

APR [illegible] 1975

Colonel Max W. Noah
District Engineer
U. S. Army Engineer District,
St. Paul
1210 U. S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Colonel Noah:

This is in response to your February 26, 1975 request for Department of the Interior review of the draft environmental impact statement for Flood Control, Root River Basin, Houston, Fillmore, Mower, Winona, Olmstead and Dodge Counties, Minnesota. The following comments, which represent only the views of the U. S. Fish and Wildlife Service, have been prepared under the authority of and in accordance with the National Environmental Policy Act of 1969.

58

4. ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

Although this section generally discusses levee construction, it does not describe the proposed construction methods or source of fill material for levee and road raises and new levee construction. If excavation and other levee work involves the riverbed adverse impacts could result to fisheries resources in the Houston area.

Some fishing for channel catfish occurs in and near the city of Houston and northern pike, walleye and sauger also are occasionally caught in this reach. These species likely move into the Root River from the Mississippi River and pass through the Houston area to more suitable habitat in unchannelized areas upstream. Depending on construction methods employed, temporary disruption of this movement and further loss of stream habitat in the Root River at Houston could result. This possibility should be considered and discussed in the final statement.

Sincerely yours,

Robert Batchelor

[illegible] Regional Director

cc: OEC, Washington, D. C.

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

Corps responses to U.S. DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

20. Consideration would be given to establishing construction schedules which would least affect propagation of fish and wildlife resources. As stated in paragraph 1.05 borrow sites for fill material would not be selected until post-authorization studies are undertaken. Borrow areas would be selected to avoid destruction of ecologically sensitive areas. The levee system is removed from the main river channel and is not expected to have any adverse impacts on fish or riverbank wildlife resources.

21. Concur. Care would be exercised during construction so that none or minimal disturbance or disruption of fish movements would occur. Also see paragraph 4.02.

United States Department of the Interior

NATIONAL PARK SERVICE
MIDWEST REGION
1709 JACKSON STREET
OMAHA, NEBRASKA 68102

IN REPLY REFER TO:

L7619 MWR CE

APR 10 1975

Colonel Max W. Noah
District Engineer
Corps of Engineers
1135 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Colonel Noah:

We have reviewed the draft feasibility report and the draft environmental statement for flood control on the Root River Basin, Minnesota. The environmental and jurisdictional concerns of the National Park Service are adequately addressed in these documents and we have no specific comments to offer.

59

Sincerely yours,

Merrill D. Beal

Merrill D. Beal
Regional Director

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

OFFICE OF THE DIRECTOR

MS-75/329

APR 25 1975

District Engineer
St. Paul District
U. S. Army Corps of Engineers
1210 U. S. Post Office and Customs House
St. Paul, Minnesota 55101

Dear Sir:

We have reviewed the draft feasibility report for flood control in the Root River Basin and offer the following comments.

We suggest that the report and subsequent draft statement should include at least a brief review of the significance of the proposed action -- S particularly structural measures -- insofar as water supplies are concerned, especially with regard to preventing interruption or contamination of supplies or to the impairment of recharge opportunities through silt distribution, etc. Furthermore, we note on page 21 that within the paragraph having a topic sentence on ground water, reference is made primarily to quality sampling of surface water. The report and draft statement should contain at least examples of typical or average parameters of water quality for both surface water and ground water, in order that impacts of the proposed action, whether beneficial or adverse, can be evaluated properly.

Thank you for the opportunity to comment on the draft feasibility report.

Sincerely yours,

Director

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

Corps responses to U.S. DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY

22. The city of Houston receives its water supply from a groundwater source. Based upon preliminary technical information, this area in and around Houston is classified a groundwater recharge area; however, any effects the proposed levee would have on the groundwater recharge would be negligible. The area behind the levee does not contribute significantly to the regional or local groundwater system. This information has been included in the revised draft EIS, paragraph 4.03.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION 5
18209 DIXIE HIGHWAY
HOMEWOOD, ILLINOIS 60430

March 10, 1975

IN REPLY REFER TO
05-00.5

Colonel Max W. Noah
District Engineer
St. Paul District, Corps of Engineers
1135 U. S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Sir:

As requested in your February 26, 1975, letter, we have reviewed the draft environmental statement for the proposed Flood Control, Root River Basin, Minnesota, and have no substantive comments to offer.

The opportunity to review and comment on the draft environmental statement is appreciated.

Sincerely yours,

H. L. Anderson
Regional Administrator

By:

W. G. Emrich, Director
Office of Environment and Design

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MARINE ADDRESS
COMMANDER (mep)
SECOND COAST GUARD DISTRICT
FEDERAL BLDG
1520 MARKET ST
ST LOUIS, MO 63103

•5922/eis

19 MAR 1975

St. Paul District
Army Corps of Engineers
1210 U. S. Post Office & Custom House
St. Paul, MN 55101

Dear Sirs:

We have reviewed the draft environmental impact statement for Flood Control, Root River Basin, Minnesota. For the Coast Guard missions of aids to navigation and bridge permits the Root River is considered navigable to Mile 2.6. Thus structural flood control work at Houston, Minnesota would be above the limits of navigability.

Thank you for the opportunity to review your draft environmental impact statement.

J. W. LEADBETTER
Captain, U. S. Coast Guard
Chief, Marine Safety Division
By direction of the District Commander

STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES
CENTENNIAL OFFICE BUILDING · ST. PAUL, MINNESOTA · 55155

April 10, 1975

Colonel Max W. Noah
District Engineer
St. Paul District
Corps of Engineers
1210 U. S. Post Office and Custom House
St. Paul, Minnesota 55101

Re: NCSED-ER

63 Dear Colonel Noah:

The Department of Natural Resources has reviewed the Draft EIS on Flood Control in the Root River Basin, and offers the following comments.

We have no basic objections to the project as proposed.

Information on specific project design is sketchy in the Draft EIS, but we feel that the new levees should be designed to fit into the natural landscape (i.e., fit the natural contour of the land) as much as possible, and more emphasis should be given to landscaping the levees to make them as unobstructive as possible, as well as to stabilize them.

Items a, c, and d under paragraph 1.11 must receive adequate attention to optimize the environmental acceptability of this project.

Sincerely,

Jerome M. Kuehn
Planning Administrator

cc: Archie D. Chelseth
Division Directors
Bob Story, Reg. Admin.
PERT Members

JMK:md

Corps responses to the MINNESOTA DEPARTMENT OF NATURAL RESOURCES

23. We concur that the new levees should be designed to fit into the natural landscape as much as possible and emphasis will be given to this in post authorization studies. Preliminary information concerning levee design is presented in the final Feasibility Report, Root River Basin, Minnesota, on file at the St. Paul District office. More information is now included in the revised draft statement, (see paragraphs 1.05-1.06). Detailed landscape plans will be developed at a later date.

24. Concur. Special attention will be paid to these items throughout our studies. Paragraph 1.11 appears as paragraph 1.13 in the revised draft statement.

MINNESOTA HISTORICAL SOCIETY

690 Cedar Street, St. Paul, Minnesota 55101 • 612-296-2747

21 March 1975

Colonel Max W. Hoah, District Engineer
Saint Paul District, Corps of Engineers
1210 U.S. Post Office and Custom House
Saint Paul, Minnesota 55101

Dear Colonel Hoah:

RE: Draft Environmenral Impact Statement: February 1975
Flood Control
Root River Basin
Minnesota

The draft Environmental Impact Statement for Flood Control Operations in the Root River Basin has been reviewed by the Survey and Planning and Archaeology sections of the Minnesota Historical Society as per your request of 26 February 1975. The reviewers concur with statements regarding the necessity of a detailed professional survey mentioned on page 19 of the Draft, and suggest that such survey for historical and archaeological features be integrated with early planning measures. As part of the development plan for this project, the survey will insure that sites will receive adequate consideration for preservation.

Respectfully,

Russell W. Fridley
State Historic Preservation Officer

RWF/fr

cc: Alan R. Woolworth, Chief Archaeologist; Minnesota Historical Society; Building 27, Fort Snelling; St. Paul, Minnesota 55111. Phone 726-1630

Douglas George, Survey Archaeologist; Minnesota Historical Society; Building 27, Fort Snelling; St. Paul, Minnesota 55111.

Charles W. Nelson, Supervisor - E.I.S.; Minnesota Historical Society; Building 25, Fort Snelling; St. Paul, Minnesota; Phone: 726-1171

Corps responses to the MINNESOTA HISTORICAL SOCIETY

25. Concur. An archaeological survey and testing of the construction area will be conducted prior to initiation of the project. Intensive testing is not planned for this phase of project development because the ultimate project alignment may well change before construction. The testing will be scheduled so as to allow sufficient time for salvage and/or design changes to avoid problem areas.

STATE OF MINNESOTA

DEPARTMENT OF AGRICULTURE
STATE OFFICE BUILDING
SAINT PAUL, MINN. 55155

LAND OF QUALITY FOODS

April 10, 1975

Colonel Max W. Noah, District Engineer
Corps of Engineers
1135 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Colonel Noah:

I would like to thank you for giving our department the opportunity to review the Draft Environmental Impact Statement for your proposal *Flood Control Project in the Root River Basin.*

From the Minnesota Department of Agriculture's vantage point, we can foresee no major adverse impact upon the agricultural community of the area. This department supports the basic concept of flood control. We believe that this project will be to the benefit of both the farmers and the town residents in the area.

Sincerely,

MINNESOTA DEPARTMENT OF AGRICULTURE

Rollin M. Dennistoun, Ph.D.
Department Administrator

RMD:hk

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STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS
ST. PAUL, MINN. 55155

April 16, 1976

U.S. Corps of Engineers
1211 U.S. Post Office and Custom House
180 East Kellogg Boulevard
St. Paul, Minnesota 55101

ATTENTION: Mr. Max W. Hoeh, Colonel
Corps of Engineers
District Engineer

Re: Draft Environmental Impact Statement
Root River Basin
U.S. Army Corps of Engineers

Gentlemen:

As requested, the above referenced Draft Environmental Impact Statement has been circulated for departmental review. The following comments were made:

1. The multi-system approach used in the evaluation and presentation of data was appreciated and aided in the understanding of the proposal.

2. There was insufficient documentation of where and when flooding occurred, and what the sustained effects were from specific flooding occurrences.

3. It was at times necessary to go back to the earlier Feasibility Report to review the various alternatives proposed for the basin. We do recall that a levee alternate proposed at Houston would have required a road raise on Trunk Highway 76 south of Trunk Highway 16. The proposal now contained in the Draft Environmental Impact Statement has eliminated that road raise and retains only a short road raise on a local road. If this is the case, the proposed construction at Houston does not appear to require any adjustments to the Trunk Highway System.

4. The flood control proposals for the remainder of the basin consist of flood plain and flood insurance programs and include no physical construction. Therefore, these programs should not directly affect the Trunk Highway System. In commenting on the preliminary feasibility report, the district did request consideration of a bridge raise on Trunk Highway 16 at Hokah and some channel work downstream of the Trunk Highway 26 river bridge. These, along with other construction proposals, apparently did not meet cost-benefit requirements.

5. The base map (Figure 1) on page 3 showing the proposed improvement is outdated and contains a number of errors in the Trunk Highway System. We had previously called attention to this in the feasibility

Corps responses to STATE OF MINNESOTA, DEPARTMENT OF HIGHWAYS

26. The information presented on pages 26-30 of the draft EIS is a general summary of the flood problems of the basin. The final Feasibility Report on the Root River Basin contains photographs of specific flood situations and is available for review at the District office should you desire more specific information.

27. The earlier Feasibility Report was based on preliminary data. Further investigations demonstrated that the road raises on Trunk Highways 76 and 16 were not required. The Trunk Highway System would not be affected.

28. Further studies have shown that these flood control proposals would not reduce flood problems.

29. An updated basin map and levee map of Houston are presented in the revised draft EIS, see plates 1 and 2.

report. The errors do not affect the specific areas of the flood control but an up-to-date map should be used in the Final Environmental Impact Statement.

6. The description on page 31 of the Flood Control Project at Rushford in 1969 includes mention of a U.S. Highway Bridge raise. The project actually included two Trunk Highway Bridge raises, Highway 16 over the Root River and Highway 43 over Rush Creek.

e appreciate your allowing us an opportunity for review. If you have any questions egarding our comments please feel free to get in touch with Roy Larson, District gineer at our Rochester office, 507 - 288-2661.

incerely,

Frank D. Marzitelli

rank D. Marzitelli
ommissioner

Corps responses to STATE OF MINNESOTA, DEPARTMENT OF HIGHWAYS (continued)

30. "U.S. Highway Bridge raise" has been deleted and "Two Trunk Highway Bridge raises" has been added, see paragraph 2.79.

STATE OF MINNESOTA

STATE PLANNING AGENCY
100 CAPITOL SQUARE BUILDING
550 CEDAR STREET
ST. PAUL, 55101

April 23, 1975

Colonel Max W. Noah
District Engineer
U.S. Army Corps of Engineers
St. Paul District
1210 U.S. Post Office and Custom House
St. Paul, Minnesota 55101

RE: Draft EIS Flood Control, Root River Basin, Minnesota

Dear Colonel Noah:

After reviewing the draft EIS (U.S. Army Corps of Engineers, February 1972), we offer the following comments:

The structural aspects of the proposed action are limited in scope, consisting of the upgrading of 2.7 miles of existing levees, the construction of 0.4 mile of new levee and 0.2 mile of road raises.

It would appear that the implementation of the project would result in minimal permanent local environmental degradation. In addition, the Draft Feasibility Report for Flood Control -- Root River Basin (U.S, Army Corps of Engineers, March 1973) states (pg. 82) that the Houston levee system is designed so that flood stages will not be increased either upstream or downstream of Houston, thus minimizing regional adverse environmental effects.

pg. 21 -- Figure 6 indicates that the population of Fillmore County is projected to decrease substantially in the years 1970-2030. However, MSPA population figures (February 1975) indicate a population increase of 100 persons from 1970-73. If indeed population trends are such that Fillmore County is experiencing a net population increase, it is essential that local authorities investigate means to regulate future floodplain development, and not rely solely on structural measures to minimize future flood damage.

The Minnesota Department of Natural Resources Special Publication #109 (Division of Fish and Wildlife, Environmental Section) addresses a more ambitious structural flood control program consisting of a dam and reservoir system on the north branch of the Root River in Fillmore County. Such a project would have considerable adverse effects on the natural environment of the area. It was the opinion of DNR that, because of the adverse effects to fish and wildlife habitats, the Lanesboro and Preston reservoir project should not be constructed.

Corps responses to STATE OF MINNESOTA, STATE PLANNING AGENCY

31. Concur. Floodplain regulation and flood insurance are important aspects of the proposed plan and essential for the reduction of flood damages in the Root River basin. Responsibility for implementation of floodplain regulations rests with the State.

32. The reservoirs are not economically feasible. These structures would have considerable adverse environmental impacts and are not part of the proposed plan.

Page 2
Colonel Max W. Noah
April ?, 1975

At this time, we would concur with the above judgment expressed by DNR. We believe that floodplain zoning for evacuation, and the floodproofing of buildings (where feasible) are preferable alternatives to large-scale construction projects which result in an irreversible destruction of important natural habitat areas. If the Corps intends, at a future date, to pursue action on the Lanesboro dam project, the Minnesota Environmental Quality Council would wish to provide input to the proposal.

Sincerely,

[illegible]

Corps responses to STATE OF MINNESOTA, STATE PLANNING AGENCY (continued)

d. If the reservoir plan were again seriously considered, involvement of the EQC would be requested.

SIERRA CLUB

NORTH STAR CHAPTER
WASHOJA GROUP

March 25, 1975

Colonel Max W. Hoeh
District Engineer
Corps of Engineers
1135 U.S. Post Office and Custom House
St. Paul, Minnesota 55101

Reference: NCSED-ER

Dear Colonel Hoeh:

I have reviewed the Draft Environmental Impact Statement for Flood Control of the Root River Basin. The effect of the proposed levees on the environment is minimal and therefore there is no objection to the plan. I suggest that the landscaping of the proposed structures use grasses, shrubs and trees that are native to this area of Minnesota. Native plant species may involve slightly higher costs but will harmonize with the surroundings and should require less maintenance in the long term.

The Environmental Impact Statement identifies soil erosion and sedimentation as a major problem in the Root River Basin and indicates the greatest source of sediment is streambank erosion. In addition to its being a problem in the Root River Basin erosion eventually contributes to the siltation of the backwaters and channel of the Mississippi. I suggest that the Corps consider the Root River for a pilot stream bank protection project in accordance with recently enacted federal legislation.

Sincerely,

Robert M. Madvig
Conservation Chairman
111 26th St. NW,
Rochester, Minnesota 55901

Corps responses to the SIERRA CLUB

34. Native vegetation is increasingly being used for District landscaping purposes, and it will be strongly considered in this case.

35. Several potential areas in Minnesota have been suggested in coordination with the State of Minnesota for pilot erosion study under the authority provided by Section 32, "Streambank Erosion Control, Evaluation and Demonstration Act" of the Water Resources Development Act of 1974 (PL 93-251). Although the Root River was not identified as one of these potential sites, because of the interest expressed by the local people and the Sierra Club, consideration will be given, once the program is funded, for including the Root River as a study site.

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 SOUTH DEARBORN ST
CHICAGO ILLINOIS 60604

17 November 1976

Lt General J. W. Morris
Chief of Engineers
Department of the Army
Office of the Chief of Engineers
Washington, D.C. 20314

RE: 76-086-196
DS-COE-F36015-MN

Dear General Morris:

The Environmental Protection Agency, Region V has completed its review of the Draft Supplement Environmental Impact Statement (EIS) and Feasibility Report for Flood Control Root River Basin, Houston, Fillmore, Mower, Winona, Olmsted and Dodge Counties, Minnesota. Your letter of August 16, 1976, requested our review and comments on these two documents. We have no major objections to the implementation of the project as planned. However, we believe additional information concerning future coordination of other projects in the Root River Basin, and the potential for levee failure should be discussed in the Final EIS. The Final Feasibility Report should discuss the flood protection methods which will be used at the Houston sewage treatment facility. Our detailed comments on each of these documents are attached separately. 1

Based on the information provided in the Draft EIS, we have rated the project as LO (Lack of Objection) and classified the EIS as Category 2 (Additional Information Required). The date and classification of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on other agency's projects.

We appreciate the opportunity to review this Revised Draft EIS. When the Final EIS is filed with the Council on Environmental Quality and when the Final Feasibility Report is completed, please forward 3 copies of each to us. If you or your staff have any questions in regard to our comments, please contact Mr. William Franz at 312-353-2307.

Sincerely yours,

Gary A. Williams
Chief,
Environmental Review Section

Attachments

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Corps Responses to the U.S.
Environmental Protection Agency

1. Existing and proposed projects will be considered in the implementation of the selected plan. It is very unlikely that the levee will fail; however, there is a rare possibility that the levee would be overtopped during a very infrequent flood. This response also applies to the EPA's comment in its letter on the draft EIS (see page 46, response 3).

COMMENTS ON THE REVISED ENVIRONMENTAL IMPACT STATEMENT

2 In our comments of April 28, 1976, we requested information on the community of Houston's expansion into flood prone areas. While the Revised EIS indicated an additional 90 acres are expected to be develop d in Houston, there was no indication of whether or not this development will be in the existing flood plain. We realize the present levee system and the improved levee system will reduce the flood hazard in Houston; however, the potential for levee failure does exist and the possibility of this occurrence and its associated cost should be addressed.

3 The alternative for flood plain evacuation should have additional information provided in order for us to determine which alternative is the most reasonable to implement. The alternative for flood plain evacuation would require the removal or relocation of 340 homes and 70 businesses. However, the Revised EIS does not provide a comparison of costs between the preferred plan and the flood plain evacuation alternative or information on whether or not land for relocation and construction is available.

The EIS provided sufficient information to determine that there are water quality problems in the Root River Basin. The major problem appears to be sedimentation and erosion. The Soil Conservation Service has two active pilot projects and plans under study for up-
4 stream reservoirs. The Final EIS should indicate how successful the erosion control projects have been and how the other projects will affect the water quality at the Root River. The impact of the recommended flood protection systems for rural areas should be discussed in the light of the number of animal feedlots in this basin. These areas have a significant potential for continued water pollution during future rural flooding.

5 Additional information on the interior drainage system and storage areas at Houston should be provided. An indication of the expected quality of the urban runoff and the eventual impacts upon the Root River should be made. Information on the drainage storage areas should indicate where these areas will be and whether or not water will be maintained in these areas permanently to act as wetland habitat.

6 An indication of how the sewage treatment facility at Houston is protected by the emergency levees should be discussed. Furthermore, the EIS should indicate what type of protection is provided for the sewage treatment facilities of Hokah, Whalen, Peterson, Lanesbora and Preston, and any flood proofing which may provide adequate protection under the recommended plan. This assessment should consider the suggested flood protection criteria found in EPA Technical

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Corps Responses to the U.S.
Environmental Protection Agency (cont.)

2. See response to comment 1. It is extremely unlikely that the levee would fail. The 90 acres that are estimated to be developed by the year 2030 at Houston are in the floodplain. Houston's topography is flat and the major portion of its damagable property is in the 100-year floodplain. In 2030 it is estimated that use of the floodplain land within the levee area at Houston will be similar for with and without project protection. However, it is possible that some location benefits will occur in the underdeveloped lands due to levee protection.

3. The floodplain evacuation alternative for Houston has a benefit-cost ratio of .8 to 1, compared to the selected plan of 2.6 to 1. Surrounding areas consist of agricultural land, wooded hillsides, and the bluffs overlooking the valley. Complete economic data is on page D-26 of the Feasibility Report for the Root River Basin.

4. The main purpose of the Soil Conservation Service Pilot Watershed Program is to reduce runoff and erosion from agricultural land. The Willow Creek Pilot Study covers an area of about 35 square miles. Rush-Pine Watershed is concerned with the area along the main channel only. A major portion of both of these projects includes land treatment measures. Both projects have reduced erosion of cropland in the immediate area.

The Hiawatha Valley RC and D Project is a USDA program with the SCS as the lead agency, and covers approximately an 11-county area in southeast Minnesota. Some of the purposes of the program are roadside and streambank erosion reduction, flood damage reduction, drainage and resource conservation and development in general. Some erosion control projects have been approved for construction.

As stated in paragraph 1.13, part of the proposed action encourages local participation in land treatment, bank stabilization and water quality management programs. The SCS has voluntary programs in which they help land owners design treatment facilities for animal feedlots including ponding and storage areas for manure.

Responsibility for evaluating the effectiveness of projects and programs of other agencies basically rests with those agencies and, in the case of conformance with water quality plans for the basin, with the Minnesota Pollution Control Agency.

Bulletin EPA-430-99-74-001 Design Criteria for Mechanical, Electic and Fluid Systems and Component Reliability, as Supplement to Federal Guidelines: Design, Operation and Maintenance of Wastewater Facilities.

Corps Responses to the U.S.
Environmental Protection Agency (cont.)

5. There are some ponds and a wetland area on the west side of Houston that would be used as a storage area. The proposed storage characteristics would be similar to those under existing conditions. Also, the wetland area would be preserved as a ponding area under the proposed plan. The other ponding area on the north side of town would drain naturally under low water conditions and would be pumped out under high water conditions. Plate H-10 in the Feasibility Report shows the ponding areas. Future studies will more precisely define the impacts of interior drainage.

6. The sewage treatment facility at Houston would be protected by the proposed levee. The proposed project would not affect the sewage treatment facilities of any other community in the basin. The Minnesota Pollution Control Agency has prepared a Segment Plan for the Root River and has developed water quality standards for the basin. The communities have constructed or are constructing sewage treatment facilities which will meet State standards. A preliminary draft of the MPCA Root River Segment Plan is in Appendix 3 of the Final Feasibility Report. A current updated version of this plan is in the "Lower Portion Upper Mississippi River Basin: Water Quality Management Basin Plan," Minnesota Pollution Control Agency, Division of Water Quality, June 1975.

COMMENTS ON FEASIBILITY REPORT

In our earlier review of the Phase I Feasibility Report, we provided our suggested criteria for the flood proofing of sewage treatment facilities to assist you in this evaluation, and we are repeating those criteria below:

EPA Technical Bulletin EPA-430-99-74-001 Design Criteria for Mechanical, Electric and Fluid Systems and Component Reliability, as Supplement to Federal Guidelines: Design, Operation and Maintenance of Wastewater Treatment Facilities recommends the following design criteria for the location of treatment works:

100. WORKS DESIGN CRITERIA

110. WORKS LOCATION

The potential for damage or interruption of operation due to flooding shall be considered when siting the treatment works. The treatment works' structures and electrical and mechanical equipment shall be protected from physical damage by the maximum expected one hundred (100) year flood. The treatment works shall remain fully operational during the twenty-five (25) year flood, if practicable' lesser flood levels may be permitted dependent on local situations, but in no case shall less than a ten (10) year flood be used. Works located in coastal areas subject to flooding by wave action shall be similarly protected from the maximum expected twenty-five (25) and one hundred (100) year wave actions.

Existing works being expanded, modified, upgraded or rehabilitated shall comply with these criteria to the degree practicable.

The flood and wave action elevations used to implement these criteria shall be determined and justified by the Grant Applicant, using available data sources where appropriate. Elevations for a specific location may be available from local or State studies as well as studies by the following Federal organizations: U.S. Army Corps of Engineers, U.S. Geological Survey, U.S. Soil Conservation Service, National Oceanic and Atmospheric Administration, and Tennessee Valley Authority.

The Works shall be accessible in all normal seasonal conditions.

The failure of the Corps of Engineers to include recommendations for the stated levels of flood protection, could prevent basin communities from consistently meeting the pollution contol requirements of the State of Minnesota.

Similarly, although the final feasibility report does indicate that a maintenance problem may develop on the portion of the Root River Channel within Houston County as a result of its classification as a judicial ditch under Minnesota Law, the report does not indicate what effect the failure to provide channel maintenance may have on upstream flood frequencies and the effectiveness of the proposed flood protection measures.

The feasibility report indicated the plan to be used would follow the National Economic Development (NED) plan rather than an Environmental Quality (EQ) Plan. The EQ plan would cost about $2,000 more than using the NED plan. We believe the cost difference is so minute that it would be just as easy to implement the EQ plan. We surmize the addition cost of the EQ plan is a result of additional erosion control and vegetative plantings, however, the Feasibility Report did not detail the differences. We believe environmental improvements associate with the EQ plan are worth the additional cost.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

PEP ER-76/816 23 November 1976

Dear General Morris:

This letter is in response to your August 16, 1976, letter requesting comments and recommendations on your proposed report and revised draft environmental impact statement concerning the Root River Basin, Minnesota. The following comments are offered for your consideration.

Revised Draft Environmental Impact Statement

The documents should indicate which aquifer furnishes the water supplies for the City of Houston; such information is significant in evaluating the potential for impacts. The existence of karst topography and caves is reported (DEIS: Section 2.20), as is the existence of a limestone caprock above the shales and sandstones in parts of the eastern basin. The significance of such geologic conditions for the specific Houston area should be discussed; this seems to be especially pertinent because local contamination of ground water is reported (FR: page 40). Any significant effects of land treatment measures on infiltration or water quality should be included in the evaluation. The location of the well field(s) of the City of Houston should be shown; if they are within the floodplain but not within the areas to be protected by the levees, floodproofing of the facilities should be considered. Any significant effects of land treatment measures on infiltration or water quality should be included in the evaluation. 7

Chief of Engineers' Proposed Report

The 2 year old cost estimates should be updated to adequately reflect the current costs.

We find that the Chief of Engineers' Proposed Report and Revised Draft Environmental Impact Statement adequately

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Corps Responses to the U.S.
Department of the Interior

7. According to the Upper Mississippi River Comprehensive Basin Study, Volume III (page E-46), the groundwater in the area is available from the Jordan-Prairie du Chien, Franconia-Galesville, and Mount Simon-Hinkley bedrock aquifers.

As stated in the revised draft EIS (paragraph 4.03 and response to Department of the Interior, Geological Survey letter of comment on the draft EIS), the city of Houston receives its water supply from a groundwater source. Based upon preliminary technical information, this area in and around Houston is classified as a groundwater recharge area; however, any effects the proposed levee would have on the groundwater recharge would be negligible. Also, the area behind the levee does not contribute significantly to the regional or local groundwater system.

The two main wells for the city of Houston are not within the floodplain. However, one auxiliary well is in the floodplain but would be within the proposed levee.

As stated by the Minnesota Department of Natural Resources (see letter of comment on the revised draft EIS), implementation of land treatment measures in the headwaters areas and along streambanks would help reduce erosion and sedimentation. These voluntary programs are an important portion of the recommended plan. We would expect these land treatment programs to have beneficial or neutral effects on infiltration and groundwater quality.

address the concerns and jurisdictions of this Department except as noted above. We appreciate the opportunity to review these documents.

Sincerely yours,

Deputy Assistant Secretary of the Interior

Lieutenant General J. W. Morris
Chief of Engineers
Department of the Army
Washington, D. C. 20314

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DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

11 November 1976

Lieutenant General J. W. Morris
Chief of Engineers
Office of the Chief of Engineers
Army Corps of Engineers
U. S. Department of the Army
Washington, D. C.

Dear General Morris:

This is in response to your letter of August 16, 1976, transmitting for our review and comments your report with pertinent papers and revised draft environmental impact statement on Root River Basin, Minnesota.

Some of the tabular data concerning agricultural land use and treatment has been updated and revised tables are provided for your use. In addition, we are enclosing comments for your consideration in preparing the final report.

Sincerely,

Paul A. Vander Hyde

PAUL A. VANDER HYDE
Deputy Assistant Secretary

4 Enclosures

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U. S. Department of Agriculture
Comments on Report and Draft Environmental Impact Statement
Root River Basin, Minnesota

1. On pages 3 and 4, Prior Studies and Report section - No mention is made of three USDA reports. These reports are: (1) USDA Preliminary Examination Report of the Root River - November 1940; (2) Runoff and Water Flow Retardation and Soil Erosion Prevention for Flood Control Purpose - November 1940; and (3) USDA Upper Mississippi River Watershed Interim Survey Report on the Root River - July 1948.

7.5 2. Beneficial or adverse effects of local flood protection at Houston on other areas of the Root River Basin should be described in the report and the environmental impact statement, or it should be stated that no such effects are anticipated.

3. As stated on page 4, the Root River Basin is an agricultural area and according to page F-13, over 25 percent of anticipated future flood damages are agricultural. We feel that it would be appropriate to include in the appendix some of the information on agricultural land use, crop yields, and extent of flooding mentioned on page F-3. Such materials would be helpful to local people wishing to follow through with locally initiated programs suggested on page 65.

4. Page 35, last paragraph - The word "woodland" should be omitted from the third sentence. Local data indicate that woodland is a rather minor source of sediment in this area, as compared with the other sources mentioned.

5. On page 43, second paragraph, first sentence - Public Law 566 should be Public Law 46. All Pilot Watersheds are under Public Law 46.

6. In the table on page B-23, the source of population projections for communities and counties should be given. We are unable to relate OBE areas 06089 and 06090 to any areas given in the 1972 OBERS projections. The relationship between these OBE areas and the BEA economic areas might be explained.

7. An explanation should be given of how costs and benefits were derived for alternative plans 1 and 4, given in table on page D-26.

8 8. Environmental Impact Statement - The remarks on control of soil erosion, line 20 of item 6.24 on page 41, beginning with the words, "All of these conservation practices . . .," could be misleading. It is unlikely that any single conservation practice would constitute adequate treatment for erosion control. Instead, the sentence should indicate, generally, that systems of conservation practices can be effective in controlling excessive erosion and reducing runoff.

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April 1977

Corps Responses to the U.S.
Department of Agriculture

7.5 Paragraph 4.02 has been modified to reflect your comment.

8. The statement in paragraph 6.24 has been modified.

9. We suggest that the following table be substituted for those on page 36 of the main report, page C-8 of Appendix 1, and Figure 11 - page 29 of the environmental impact statement.

Sediment Sources for the Root River Basin

Type Sediment and Sources	Erosion Hazard by Counties in the Root River Basin					
	Houston	Fillmore	Mower	Winona	Olmsted	Dodge
Fine Agricultural Land	Severe	Severe	Serious	Severe	Serious	Moderate
Sands Gully Streambank	Severe	Severe	-	Serious	Moderate	-

The original table identifies, by county, the two major types of sediment in the Root River Basin. The "fine" sediments would be the silts and clays and generally come from the agricultural lands. The sands more often have streambanks and gullies as their source. If these tables are retained in their present form, the word "major" should be omitted from the title in accordance with comment 4 above.

10. The paragraph on page 36 and paragraph 2.77 of the environmental impact statement should be revised as follows to show the correct percentages of land adequately treated: "During recent years an attempt has been made to adequately treat the lands which are the major sources of sediment in the basin. Current records indicate that approximately 35, 58, and 46 percent of the total acres of cropland, woodland, and pastureland, respectively, in the basin are adequately treated."

Corps Responses to the U.S. Department of Agriculture (cont.)

9. The table has been replaced.

10. Corrections have been made.

11. We suggest that the table on page C-9 of Appendix 1 and Figure 12 - page 30 of the environmental impact statement be replaced by the following:

11

Farming Units, Cooperators, Land Use, and Percent of Treated Land by County for the Root River Basin (1)

Item	Counties of the Root River Basin					
	Houston	Fillmore	Mower	Dodge(2)	Olmsted	Winona
Farming units	809	2,184	617	16	515	400
Number of cooperators	638	1,449	280	12	265	307
Land-use acres						
Cropland	76,160	318,780	125,450	3,355	60,000	75,840
Woodland	99,730	80,730	9,650	130	20,750	30,290
Pastureland	15,560	54,660	2,760	250	19,990	20,280
Percentage of land adequately treated						
Cropland	65	28	25	42	40	43
Woodland	70	50	80	80	32	50
Pastureland	25	42	35	35	60	20

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(1) Prepared by St. Paul District, Corps of Engineers
(2) Estimates for the 6.3840 sq. miles in Dodge

Corps Responses to the U.S. Department of Agriculture (*cont.*)

11. Corrections have been made.

12. The following table should be substituted for the one on page 67, and also on page D-23, Appendix 1.

12

Recommended Structural and Nonstructural Land Treatment Practices for Counties in the Root River Basin (1)

Recommended Practices	Root River Basin by Counties					
	Houston	Fillmore	Mower	Winona	Olmsted	Dodge(2)
Strip cropping	X	X	X	X	X	X
Mulch tillage	X	X	X	X	X	X
Contour farming	X	X	X	X	X	
Streambank protection	X	X		X	X	
Stabilization structures	X	X		X	X	
Regulated grazing	X	X		X	X	
Conservation practices	X	X		X	X	
Prevent grazing	X	X		X	X	

(1) Information obtained from the Soil Conservation Service
(2) Information currently not available.

Corps Responses to the U.S. Department of Agriculture (cont.)

12. The table has been corrected.

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES
CENTENNIAL OFFICE BUILDING · ST PAUL, MINNESOTA · 55155

DNR INFORMATION
(612) 296 6157

December 1, 1976

Colonel Forrest T. Gay
St. Paul District Corps of Engineers
1135 U.S. Post Office and Custom House
St. Paul, MN 55101

Dear Colonel Gay,

ROOT RIVER BASIN FEASIBILITY STUDY AND ENVIRONMENTAL IMPACT STATEMENT

This Department has reviewed the Root River Feasibility Study and Environmental Impact Statement forwarded by your October 14, 1976 letter. The Department of Natural Resources again expresses its support of the selected alternatives of construction of a levee at Houston and dependence on flood plain regulations and flood insurance throughout the rest of the basin. These alternatives are consistant with State policies as enumerated in Minnesota Statutes Chapter 104.

The following general comments apply to both reports:

13 1. The 100 year flood elevations for Whalan mentioned several times in the reports are incorrect. Check your hydrology file for Whalan.

14 2. Removal of the designation of a portion of the Root River as a judicial ditch would not preclude future channel improvements. These improvements would, however, require a permit under Minnesota Statutes Chapter 105.

15 3. Cost/Benefit ratios of less than one for the flood insurance and flood plain regulation alternatives are misleading. We recognize that your economic analysis for structural alternatives does not allow crediting benefits from future development. The primary thrust of flood plain regulations, however, is at preventing unwise future development, not protecting existing development. The elimination or upgrading of nonconforming uses will occur but will be far less significant. As a result, your analysis considerably understates the cost effectiveness of these alternatives. We feel that this problem should be elaborated on in the text.

The following comments apply to the Root River Feasibility Report:

1. Alternative 1: Base Condition (No Action) (Page 55). Flood

Corps Responses to the Minnesota
Department of Natural Resources

13. The 100-year flood elevation for Whalan should be 792.5. Figure 8 has been corrected.

14. Paragraph 2.81 has been modified to reflect your comment.

15. Our benefit-cost ratios are correct given administrative costs and our policy of not including benefits accrued to future development. However, preventing future construction in a flood damage area may provide secondary benefits exceeding the costs of adopting and implementing regulations.

insurance studies for all communities except for the City of Rushford will be initiated this fiscal year.

2. Flood Control Alternatives at Hokah, Whalan, Peterson, Lanesboro, and Preston (Page 60). Peterson is not eligible for the flood insurance program and has not adopted a land use resolution.

3. Flood Control Activities for Rural Areas (Page 60). Crops are not covered by the National Flood Insurance Program.

4. Appendix 1: Comparison of Identified Plans (Page D-31). The "trade-off of levees at Houston for flood plain regulation and flood insurance" is not really a trade-off. Houston will be required to enforce land use regulations in those areas of the City not protected by the levee and flood insurance will continue to be available. These programs are designed to complement each other.

The following comments apply to the Environmental Impact Statement:

16 1. Section 3.02. Flood plain regulations do not "prohibit non-conforming uses." Non-conforming uses are uses that are in existance at the time that land use regulations are adopted. They can continue to exist and be repaired and maintained for the life of the structure or use. Flood plain regulations are most effective in regulating future land use.

17 2. Sections 4.11 and 4.15. It should be emphasized that the elimination of non-conforming uses is a long-term process, the results of which may not be apparent for several decades.

18 The Department also supports full implementation of land treatment measures in the headwater areas and along streambanks to control erosion and reduce sedimentation. The selected alternatives are not complete without continued emphasis on the voluntary programs administered by the Soil Conservation Service.

Very truly yours,

Robert L. Herbst,
Commissioner of Natural Resources

RLH

84

Corps Responses to the Minnesota
Department of Natural Resources (cont.)

16. Paragraph 3.02 has been modified according to your comments.

17. Paragraphs 4.11 and 4.15 have been modified.

18. Comment noted and concurred with.

Lt. Gen[illegible]
Chief of Engineers
Department of the Army
Washington, D.C. [illegible]

Dear General Mutt[illegible]

This is in response to your [illegible] which requested our comments on the draft environmental impact statement prepared for the Flood [illegible] on the Red River basin, Minnesota. The report includes the City of Moorhead, Minnesota, for which the Corps of Engineers has [illegible] district, is proposing a time and cost estimate for a flood insurance study. A specific reason for your statement [illegible] statement apparently is better understanding [illegible] the nonstructural impacts of flood [illegible] flood plain regulation and the flood insurance program.

> Section 4.09: "Strict flood plain regulations do have some adverse effects... it may be difficult to borrow money from a bank or other loan institution for a mortgage on a home located in a flood-prone area. Likewise, it is very difficult for the owner of that property to sell it...."

While we agree that the extent of the flood hazard in Houston may make people think twice about buying a home there or extending a loan for residential property, we do not agree that flood plain regulation has this effect. The primary consideration is the danger to which the property is exposed, not the extent to which the danger is mitigated by flood plain management or flood proofing requirements. In fact, the National Flood Insurance Program should ease this situation by providing insurance against the probable flood loss.

Section 202 (b) of the Flood Disaster Protection Act has recently been revised. Section 202 (b) requires Federal instrumentalities which supervise banks, savings and loan associations, or similar institutions by regulations to prohibit such institutions from making, increasing, extending or renewing any loan secured by improved real estate or a mobile home located or to be located in an area that has been identified as having special flood hazards, if the community within which such area is located is

not participating in the National Flood Insurance Program and has passed its statutory deadline for participation (the latter of July 1, 1975 or one year following notification of formal identification of the areas as having special flood hazards).

The Revision exempts from the above prohibition against lending (1) any loan to finance the acquisition of a residential dwelling occupied as a residence prior to March 1, 1976, or one year following identification of the area within which such dwelling is located as a special flood hazard area; (2) any loan, which does not exceed amount prescribed by the Secretary, to finance the acquisition of a building or structure completed and occupied by a small business concern, as defined by the Secretary, prior to January 1, 1976; (3) any loan or loans, which in the aggregate do not exceed $5,000, to finance improvements to or rehabilitation of a building or structure occupied as a residence prior to January 1, 1976; or (4) any loan or loans, which in the aggregate do not exceed an amount prescribed by the Secretary, to finance non-residential additions or improvements to be solely for agricultural purposes on a farm.

20 Section 4.12: "New structures would be insured at actuarial rates."

This phrase should be clarified. Buildings constructed after the effective date of a Flood Insurance Rate Map (FIRM) are considered "new construction." The FIRM is the end product of a Flood Insurance Study (FIS). The Corps of Engineers, St. Paul District, is just now submitting a time and cost estimate for such a study to the Federal Insurance Administration.

Section 4.13: "The payment of insurance premiums would in many cases be expensive."

21 The premium rate for those enrolled in the National Flood Insurance Program is $.25/$100 of coverage, or approximately $78.00 per year for the $35,000 worth of residential coverage available under the Emergency Program. Actuarial rates and additional coverage would not be available until completion of the FIS and the effective date of the FIRM. If the City properly enforces zoning and building code regulations that meet state and federal standards the insurance rate should prove reasonable.

We have attached a copy of current program regulations and other material concerning the Flood Insurance Program for your information in preparing any revisions for inclusion in the Final Impact Statement. We appreciate the opportunity to comment on the proposed project.

Sincerely,

Don Morrow
Regional Administrator

Enclosures

Corps Responses to the U.S.
Department of Housing and Urban Development (cont.)

20. The sentence has been clarified.

21. The sentence has been modified. The cost figures have not been added to the paragraph because they are somewhat beyond the scope of the impact statement.

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS
U S COAST GUARD (G-WS/73)
WASHINGTON, D.C.
PHONE (202) 426-2262

26 October 1976

Lieutenant General J. W. Morris
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Morris:

This is in response to your letter of 16 August 1976 addressed to Secretary Coleman concerning a draft environmental impact statement for the Root River Flood Control Project, Houston, Fillmore, Winona and Olmstead Counties, Minnesota.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

The opportunity to review this draft statement is appreciated.

Sincerely,

AD-A118 291 CORPS OF ENGINEERS ST PAUL MN ST PAUL DISTRICT F/G 13/2
FLOOD CONTROL ROOT RIVER BASIN, MINNESOTA.(U)
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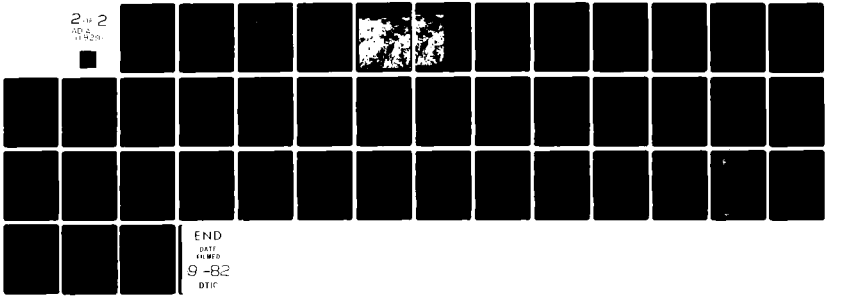

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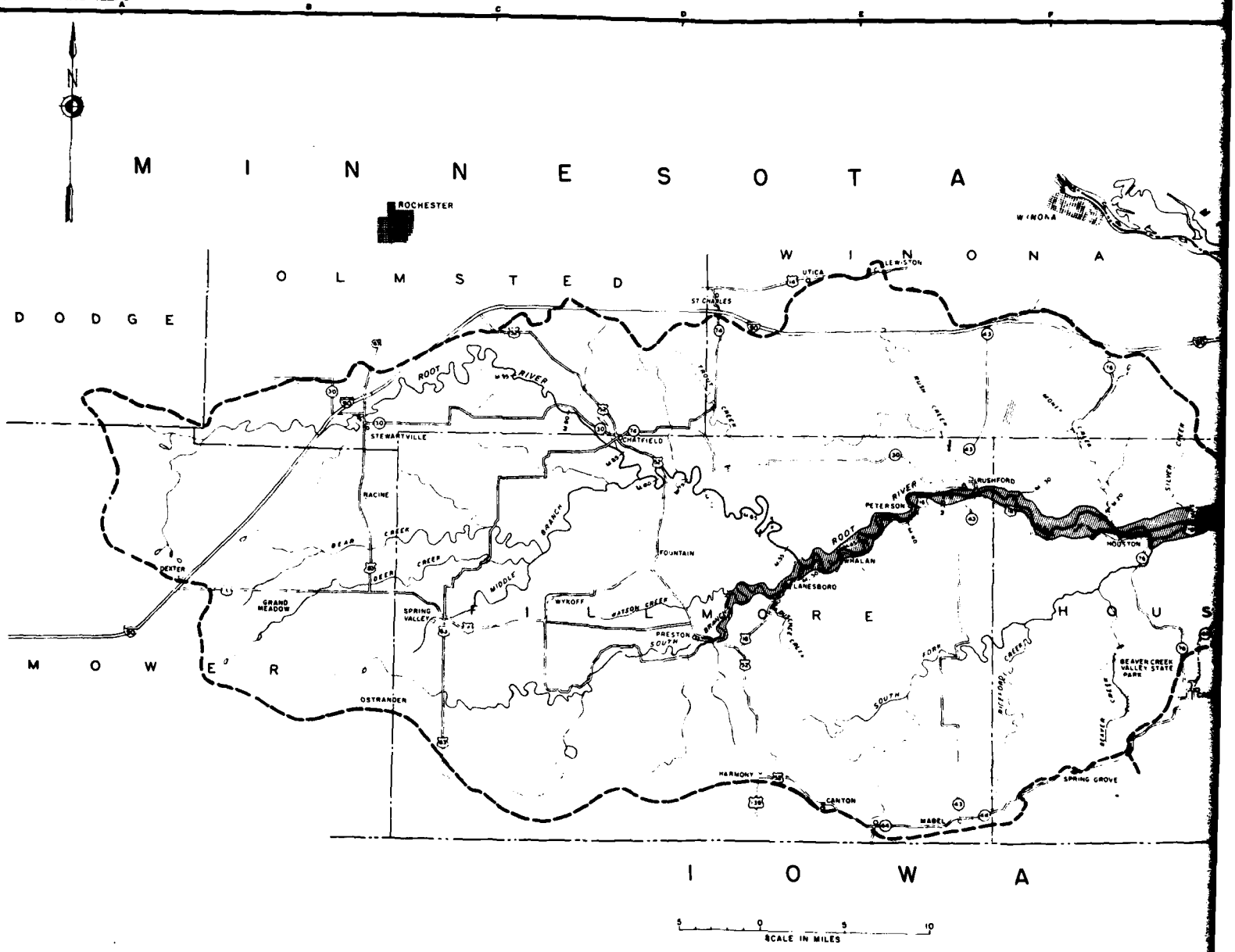
CORPS OF ENGINEERS



THE SELECTED PLAN

a. Levee at Houston

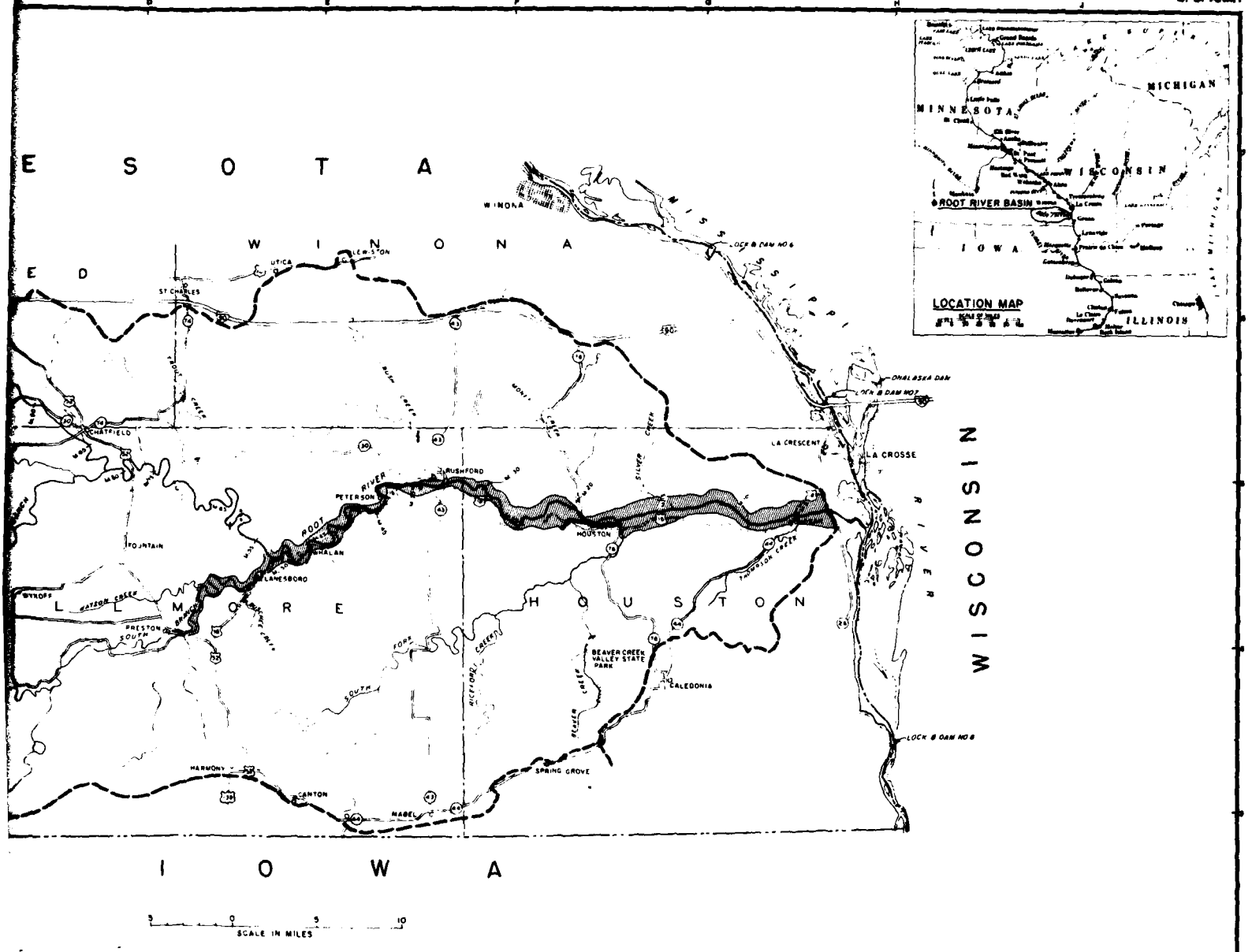
b. Local interests are encouraged to adopt floodplain regulations and to acquire flood insurance at other flood prone communities and rural areas, and to participate in appropriate land treatment, bank stabilization, and water quality management programs.

LEGEND

LEVEE AT HOUSTON

FLOOD PRONE AREA (Area which has been designated a flood hazard area)

U. S. ARMY



LEGEND

LEVEE AT HOUSTON

FLOOD PRONE AREA (Area which has been designated a flood hazard area)

FEASIBILITY REPORT FOR FLOOD CONTROL
ROOT RIVER, MINNESOTA
GENERAL MAP OF BASIN
SELECTED PLAN OF IMPROVEMENTS

ST PAUL DISTRICT CORPS OF ENGINEERS
FILE NO M25-R-7/16 JUNE 1975

PLATE 1

CORPS OF ENGINEERS

U. S. ARMY

LEGEND

LEVEES

ROAD RAISES

FEASIBILITY REPORT FOR FLOOD CONTROL
ROOT RIVER BASIN

LEVEE AT HOUSTON, MINNESOTA

SCALE AS SHOWN

ST PAUL DISTRICT CORPS OF ENGINEERS

FILE NO. M25-R-7/17 JUNE 1975

PLATE 2

APPENDIX A

COMMON AND SCIENTIFIC NAMES OF VEGETATION OF THE ROOT RIVER BASIN

Prevalent upland woody species[1]

Common name	Scientific name	Relative abundance
White oak	*Quercus alba*	Abundant
Northern red oak	*Q. borealis*	Abundant
Black oak	*Q. velutina*	Abundant
Basswood	*Tilia americana*	
Black cherry	*Prunus serotina*	Abundant
Bur oak	*Quercus macrocarpa*	Abundant
Sugar maple	*Acer saccharum*	Uncommon
Slippery elm	*Ulmus rubra*	Common
Shagbark hickory	*Carya ovata*	Common
White ash	*Fraxinus americana*	Common
Jack oak	*Quercus ellipsoidalis*	Common
Bigtooth aspen	*Populus grandidentata*	Common
Hornbeam	*Ostrya virginiana*	Uncommon
American elm	*Ulmus americana*	Common
Red maple	*Acer rubrum*	Common
Bitternut	*Carya cordiformis*	Common
Black walnut	*Juglans nigra*	Common
Butternut	*J. cinerea*	Uncommon
Chinquapin oak	*Quercus muhlenbergii*	Uncommon
Box elder	*Acer negundo*	Uncommon
Quaking aspen	*Populus tremuloides*	Common
Paper birch	*Betula papyrifera*	Uncommon
Green ash	*Fraxinus pennsylvanica*	Uncommon
Beech	*Fagus grandifolia*	Rare
Rock elm	*Ulmus thomasi*	Rare
Hackberry	*Celtis occidentalis*	Uncommon
Swamp oak	*Quercus bicolor*	Rare
Black ash	*Fraxinus nigra*	Rare
Black birch	*Betula lutea*	Rare

(1) Curtis, J. T., The Vegetation of Wisconsin, Wisconsin University Press. Madison, Wisconsin, 1959.

Prevalent upland shrubby and herbaceous groundlayer species[1]

Common name	Scientific name	Relative abundance
Maidenhair fern	*Adiantum pedantum*	Common
Agrimonie	*Agrimonia gryposepala*	Uncommon
Hog-peanut	*Amphicarpa bracteata*	Abundant
Wood anemone	*Anemone quinquefolia*	Common
Thimbleweed	*A. virginiana*	Rare
Spreading dogbane	*Apocynum androsaemifolium*	Uncommon
Wild sarsaparilla	*Aralia nudicaulis*	Common
Spikenard	*A. racemosa*	Uncommon
Swamp Jack-in-the-pulpit	*Ariseama triphyllum*	Abundant
Arrow-leaved aster	*Aster sagittfolius*	Uncommon
Short's aster	*A. shortii*	Uncommon
Lady fern	*Athyrium filix-femina*	Common
Rattlesnake fern	*Botrychium virginianum*	Common
Grass bearded short husk	*Brachyelytrum erectum*	Common
Sedge	*Carex pennsylvanica*	Abundant
Blue cohosh	*Caulophyllum thalictroides*	Uncommon
American bittersweet	*Celastrus scandens*	Common
Alternative-leaved dogwood	*Cornus alternifolia*	Uncommon
Grey dogwood	*C. racemosa*	Abundant
Roundleaf dogwood	*C. rugosa*	Uncommon
American hazelnut	*Corylus americana*	Abundant
Honewort	*Cryptotaenia canadensis*	Common
Sticktight	*Desmodium glutinosum*	Common
Wild yam	*Dioscorea villosa*	Uncommon
Wild strawberry	*Fragaria virginiana*	Uncommon
Cleavers	*Galium aparine*	Common
Bedstraw	*G. concinnum*	Abundant
Fragrant bedstraw	*G. triflorum*	Uncommon
Geranium	*Geranium maculatum*	Abundant
White avens	*Geum canadense*	Common
Pale-leaved wood sunflower	*Helianthus strumosus*	Common
Virginia waterleaf	*Hydrophyllum virginanum*	Common
Bottle-brush grass	*Hystrix patula*	Uncommon
Blue lettuce	*Lactuca biennis*	Uncommon
Wild honeysuckle	*Lonicera prolifera*	Uncommon
Sweet cicely	*Osmorhiza claytoni*	Uncommon
Pellitory	*Parietaria pennsylvanica*	Common
Interrupted fern	*Osmunda claytoniana*	Uncommon
Riverbank grape	*Parthenocissus vitacea*	Abundant
Lopseed	*Phryma leptostachya*	Common
May-apple	*Podophyllum peltatum*	Abundant
Hairy Solomon's seal	*Polygonatum pubescens*	Common

Prevalent upland shrubby and herbaceous groundlayer species[1] (Cont)

Common name	Scientific name	Relative abundance
White lettuce	*Prenanthes alba*	Uncommon
Bracken	*Pteridium aquilinum*	Common
Kidneyleaf buttercup	*Ranunculus abortivus*	Uncommon
Poison ivy	*Rhus toxicodendron*	Common
Pasture gooseberry	*Ribes cynosbati*	Uncommon
Rose	*Rosa sp.*	Uncommon
Black raspberry	*Rubus allegheniensis*	Common
Red raspberry	*Rubus strigosus*	Common
Elder berry	*Sambucus canadensis*	Rare
Bloodroot	*Sanguinaria canadensis*	Abundant
Black snakeroot	*Sanicula gregaria*	Abundant
False Solomon's seal	*Smilacina racemosa*	Abundant
Greenbrier	*Smilax ecirrhata*	Uncommon
Carrion flower	*Smilax herbaccea*	Uncommon
Goldenrod	*Solidago ulmifolia*	Common
Meadow rue	*Thalictrum dioicum*	Common
Feverwort	*Triosteum perfoliatum*	Rare
Large-flowered bellwort	*Uvularia grandiflora*	Abundant
Culver's-root	*Veronicastrum virginicum*	Uncommon
Marsh blue violet	*Viola cucullata*	Abundant
Downy yellow violet	*Viola pubescens*	Abundant
Summer grape	*Vitis aestivalis*	Common
Prickly ash	*Zanthoxylum americanum*	Common

(1) Curtis, J. T., The Vegetation of Wisconsin, Wisconsin University Press, Madison, Wisconsin, 1959.

Prevalent lowland woody species[1]

Common name	Scientific name	Relative abundance
Silver maple	*Acer saccharinium*	Abundant
American elm	*Ulmus americana*	Abundant
Black willow	*Salix nigra*	Abundant
Cottonwood	*Populus deltoides*	Abundant
Green ash	*Fraxinus pennsylvanica*	Common
River birch	*Betula nigra*	Abundant
Swamp oak	*Quercus bicolor*	Abundant
Basswood	*Tilia americana*	Common
Black ash	*Fraxinus nigra*	Common
Northern red oak	*Quercus borealis*	Uncommon
White ash	*Fraxinus americana*	Common
Bur oak	*Quercus macrocarpa*	Common
Slippery elm	*Ulmus rubra*	Uncommon
Shagbark hickory	*Carya ovata*	Uncommon
White oak	*Quercus alba*	Uncommon
Black oak	*Q. velutina*	Common
Box elder	*Acer negundo*	Common
Bitternut hickory	*Carya cordiformis*	Uncommon
Black cherry	*Prunus serotina*	Uncommon
Aspen	*Populus tremuloides*	Uncommon
Peachleaf willow	*Salix amygdaloides*	Uncommon

(1) Curtis, J. T., The Vegetation of Wisconsin, Wisconsin University Press, Madison, Wisconsin, 1959.

Prevalent lowland groundlayer species[1]

Common name	Scientific name	Relative abundance
Hog-peanut	*Amphicarpa bracteata*	Common
Grove sandwort	*Arenaria lateriflora*	Common
Swamp Jack-in-the-pulpit	*Arisaema triphyllum*	Abundant
Dragon arum	*A. dracontium*	Uncommon
Calico aster	*Aster lateriflorus*	Common
Lady fern	*Athyrium filix-femena*	Uncommon
False nettle	*Boehmeria cylindrica*	Common
Enchanter's nightshade	*Circaea quadrisulcata*	Common
Honewort	*Cryptotaenia canadensis*	Common
Dodder	*Cuscuta gronovii*	Uncommon
Wild yam	*Dioscorea villosa*	Uncommon
Wild rye	*Elymus virginicus*	Common
Fragrant bedstraw	*Galium triflorum*	Common
White avens	*Geum canadense*	Abundant
Manna grass	*Glyceria striata*	Common
Jewel weed	*Impatiens biflora*	Abundant
Wood nettle	*Laporta canadensis*	Abundant
Rice cutgrass	*Leersia virginica*	Common
Water horehound	*Lycopus uniflorus*	Common
Moon seed	*Menispermum canadense*	Common
Royal fern	*Onoclea sensibilis*	Common
Sweet cicely	*Osmorhiza claytoni*	Common
Wood bine	*Parthenocissus vitacea*	Abundant
Hairy Solomon's seal	*Polygonatum pubescens*	Common
Kidneyleaf buttercup	*Ranunculus abortivus*	Common
Poison ivy	*Rhus toxicodendron*	Common
American black current	*Ribes americanum*	Common
Elder berry	*Sambucus candensis*	Uncommon
Black snakeroot	*Sanicula gregaria*	Common
Starry false Solomon's seal	*Smilacina stellata*	Common
Greenbrier	*Smilax ecirrhata*	Common
Carrion flower	*S. herbacea*	Uncommon
Swamp nightshade	*Solanum dulcamara*	Common
Giant goldenrod	*Solidago gigantea*	Common
Fringed loostrife	*Lysimachia ciliata*	Abundant
Marsh blue violet	*Viola cucullata*	Abundant
Downy yellow violet	*V. pubescens*	Common
Riverbank grape	*Vitis riparia*	Common
Prickly ash	*Zanthoxylum americanum*	Common

(1) Curtis, J. T., The Vegetation of Wisconsin, Wisconsin University Press, Madison, Wisconsin, 1959.

APPENDIX B

MAMMALS FOUND IN THE UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE

Mammals found in the Upper Mississippi River wildlife and fish refuge

Common name	Scientific name	Abundance
Virginia opossum	*Didelphis marsupialis*	Common
Masked shrew	*Sorex cinereus*	Common
Shorttail shrew	*Blarina brevicauda*	Common
Least shrew	*Cryptotis parva*	Common
Eastern mole	*Scalopus aquaticus*	Common
Starnose mole	*Condylura cristata*	Rare
Little brown bat	*Myotis lucifugus*	Common
Keen's bat	*Myotis keenii*	Common
Eastern pipistrel	*Pipistrellus subflavus*	Uncommon
Big brown bat	*Eptesicus fuscus*	Common
Red bat	*Lasiurus borealis*	Common
Hoary bat	*Lasiurus cinereus*	Rare
Whitetail jackrabbit	*Lepus townsendii*	Rare
Eastern cottontail	*Sylvilagus floridanus*	Common
Woodchuck	*Marmota monax*	Common
Thirteen-lined ground squirrel	*Citellus tridecemlincatus*	Common
Franklin ground squirrel	*Citellus franklinii*	Rare
Eastern chipmunk	*Tamias striatus*	Common
Eastern gray squirrel	*Sciurus carolinensis*	Common
Eastern fox squirrel	*Sciurus niger*	Common
Red squirrel	*Tamiasciusus hudsonicus*	Occasional
Southern flying squirrel	*Glaucomys volans*	Occasional
Plains pocket gopher	*Geomys bursarius*	Occasional
Beaver	*Castor canalensis*	Common
Western harvest mouse	*Reithrodontomys megalotis*	Uncommon
Deer mouse	*Peromyscus maniculatus*	Common
White-footed mouse	*Peromyscus leucopus*	Common
Southern bog lemming	*Synaptomys cooperi*	Common
Meadow vole	*Microtus pennsylvanicus*	Common
Prairie vole	*Pedomys ochrogaster*	Common
Pine vole	*Pitymys pinetorum*	Occasional
Muskrat	*Ondatra zibethicus*	Common
Norway rat	*Rattus norvegicus*	Common
House mouse	*Mus musculus*	Common
Meadow jumping mouse	*Zapus hudsonius*	Common
Nutria	*Myocaster coypus*	Rare
Coyote	*Canis latrans*	Occasional
Red fox	*Vulpes fulva*	Common
Gray fox	*Urocyon cinereoargenteus*	Common
Raccoon	*Procyon lotor*	Common
Least weasel	*Mustela rixosa*	Uncommon
Mink	*Mustela vison*	Erratic
Badger	*Taxidea taxus*	Uncommon

Mammals found in the Upper Mississippi River wildlife and fish refuge (continued)

Common name	Scientific name	Abundance
Spotted skunk	*Spilogale putorius*	Occasional
Striped skunk	*Mephitis mephitis*	Common
River otter	*Lutra canadensis*	Occasional
Lynx	*Lynx canadensis*	Rare
Bobcat	*Lynx rufus*	Rare
White-tailed deer	*Odocoileus virginianus*	Common

Source: United States Department of the Interior, Fish and Wildlife Service, 1975, Mammals: Upper Mississippi River Wildlife and Fish Refuge.

APPENDIX C

BIRDS FOUND IN THE UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE

Birds found in the Upper Mississippi River wildlife and fish refuge

Common name	Seasonal abundance			
	Spring	Summer	Fall	Winter
Common loon	Rare		Rare	
Red-necked grebe	Rare		Rare	
Horned grebe	Rare		Rare	
Pied-billed grebe*	Common	Common	Common	
White pelican	Occasional		Occasional	
Double-crested cormorant*	Common	Common	Common	
Great blue heron*	Common	Common	Common	Rare
Green heron	Common	Common	Common	
Little blue heron		Rare		
Common egret*	Common	Common	Occasional	
Snowy egret	Rare	Rare		
Black-crowned night heron*	Common	Common	Common	
Yellow-crowned night heron*	Uncommon	Uncommon	Uncommon	
Least bittern*	Occasional	Occasional	Occasional	
American bittern*	Common	Common	Common	
Whistling swan	Common		Common	
Canada goose*	Common	Occasional	Common	Occasional
White-fronted goose	Rare		Rare	
Snow goose	Common		Common	
Blue goose	Common		Common	
Mallard*	Abundant	Common	Abundant	Common
Black duck*	Common	Occasional	Common	Occasional
Gadwall	Common		Common	
Pintail	Abundant	Rare	Abundant	Rare
Green-winged teal*	Common	Rare	Common	Rare
Blue-winged teal	Abundant	Uncommon	Abundant	
American widgeon	Abundant		Abundant	
Shoveler	Common		Common	
Wood duck*	Common	Common	Common	
Redhead	Common	Occasional	Common	Rare
Ring-necked duck	Abundant		Abundant	Rare
Canvasback	Common		Common	Rare
Greater scaup	Uncommon		Uncommon	
Lesser scaup	Abundant	Rare	Abundant	Rare
Common goldeneye	Common		Common	Occasional
Bufflehead	Occasional		Occasional	Rare
Oldsquaw	Rare		Rare	Rare

Birds found in the Upper Mississippi River wildlife and fish refuge (continued)

Common name	Seasonal abundance			
	Spring	Summer	Fall	Winter
White-winged scoter	Rare		Rare	Rare
Common scoter			Rare	Rare
Ruddy duck	Common	Rare	Common	
Surf scoter	Rare		Rare	
Hooded merganser*	Common	Occasional	Common	Rare
Common merganser	Common		Common	
Red-breasted merganser	Rare		Rare	Rare
Turkey vulture	Occasional	Occasional	Occasional	Rare
Goshawk				Occasional
Sharp-shinned hawk	Uncommon	Uncommon	Uncommon	Occasional
Cooper's hawk*	Uncommon	Uncommon	Uncommon	Occasional
Red-tailed hawk	Common	Common	Common	Common
Red-shouldered hawk	Occasional	Occasional	Occasional	Uncommon
Swainson's Hawk			Rare	
Broad-winged hawk*	Occasional	Occasional		
Rough-legged hawk			Occasional	Occasional
Golden eagle	Rare		Rare	Rare
Bald eagle *	Occasional	Occasional	Occasional	Common
Marsh hawk*	Common	Common	Common	Occasional
Osprey	Occasional	Occasional	Occasional	Occasional
Peregrine falcon*	Rare	Rare	Rare	
Pigeon hawk	Rare		Rare	
Sparrow hawk	Occasional	Occasional	Occasional	Rare
Ruffed grouse*	Common	Common	Common	Common
Greater prairie chicken				Rare
Sharp-tailed grouse				Rare
Bobwhite*	Occasional	Occasional	Occasional	Occasional
Ring-necked pheasant*	Common	Common	Common	Common
Gray partridge	Occasional	Occasional	Occasional	Occasional
Turkey	Occasional	Occasional	Occasional	Occasional
King rail*	Uncommon	Uncommon		
Virginia rail*	Uncommon	Uncommon	Occasional	
Sora*	Abundant	Abundant	Common	
Common gallinule*	Rare	Rare		
American coot*	Abundant	Common	Abundant	Rare
Semipalmated plover	Common	Occasional	Common	
Killdeer*	Common	Common	Common	Rare
American golden plover	Occasional		Uncommon	
Black-bellied plover	Occasional		Occasional	
Ruddy turnstone	Rare			
American woodcock	Rare	Rare	Rare	
Common snipe	Common	Occasional	Common	Rare
Upland plover	Occasional	Occasional		
Spotted sandpiper*	Common	Common	Common	
Solitary sandpiper	Common		Common	

Birds found in the Upper Mississippi River wildlife and fish refuge (continued)

Common name	Seasonal abundance			
	Spring	Summer	Fall	Winter
Willet	Rare		Rare	
Greater yellowlegs	Uncommon		Uncommon	
Lesser yellowlegs	Abundant	Occasional	Abundant	
Pectoral sandpiper	Occasional	Occasional	Occasional	
White-rumped sandpiper	Occasional		Occasional	
Baird's sandpiper	Occasional	Occasional	Occasional	
Least sandpiper	Common	Occasional	Common	
Dunlin	Occasional	Occasional	Occasional	
Marbled Godwit	Rare			
Hubsonian Godwit	Rare			
Long-billed dowitcher	Occasional		Occasional	
Stilt sandpiper	Occasional	Occasional	Occasional	
Semipalmated sandpiper	Common	Common	Common	
Short-billed dowitcher	Uncommon	Uncommon	Uncommon	
Sanderling	Occasional	Occasional	Occasional	
Wilson's phalarope	Occasional	Occasional	Occasional	
Northern phalarope	Occasional		Occasional	
Herring gull	Common	Occasional	Common	Uncommon
Ring-billed gull	Common	Occasional	Common	Uncommon
Franklin's gull	Occasional		Occasional	
Bonaparte's gull	Uncommon		Uncommon	
Forster's tern	Common	Occasional	Common	
Common tern	Common	Occasional	Common	
Least tern	Occasional	Occasional	Occasional	
Caspian tern	Occasional		Occasional	
Black tern*	Common	Common	Occasional	
Rock dove	Common	Common	Common	Common
Mourning dove*	Common	Common	Common	Occasional
Yellow-billed cuckoo*	Common	Common		
Black-billed cuckoo*	Common	Common		
Screech owl*	Common	Common	Common	Common
Great horned owl*	Common	Common	Common	Common
Snowy owl				Occasional
Barred owl*	Common	Common	Common	Common
Long-eared owl	Uncommon	Uncommon	Uncommon	Uncommon
Short-eared owl	Uncommon	Uncommon	Uncommon	Uncommon
Saw-whet owl*	Uncommon	Uncommon	Uncommon	Uncommon
Whippoorwill*	Common	Common		
Common nighthawk*	Abundant	Abundant	Occasional	
Chimney swift*	Abundant	Abundant		
Ruby-throated hummingbird*	Common	Common		
Belted kingfisher	Common	Common	Occasional	Uncommon
Yellow-shafted flicker*	Common	Common	Common	Uncommon
Pileated woodpecker*	Occasional	Occasional	Occasional	Occasional
Red-bellied woodpecker*	Common	Common	Common	Common
Redheaded woodpecker*	Common	Common	Common	Rare

Birds found in the Upper Mississippi River wildlife and fish refuge (continued)

Common name	Seasonal abundance			
	Spring	Summer	Fall	Winter
Yellow-bellied sapsucker	Common		Common	
Hairy woodpecker*	Common	Common	Common	Common
Downy woodpecker*	Common	Common	Common	Common
Eastern kingbird*	Abundant			
Great crested flycatcher*	Common	Common		
Eastern phoebe*	Common	Common	Occasional	
Yellow-bellied flycatcher	Uncommon	Uncommon	Uncommon	
Acadian flycatcher	Occasional	Occasional		
Alder flycatcher	Common	Common	Occasional	
Willow Flycatcher	Common	Common	Uncommon	
Least flycatcher*	Abundant	Abundant	Uncommon	
Eastern wood pewee*	Common	Common	Uncommon	
Olive-sided flycatcher	Occasional	Occasional		
Horned lark*	Common	Common	Common	Occasional
Tree swallow*	Abundant	Abundant	Uncommon	
Bank swallow*	Common	Common	Uncommon	
Rough-winged swallow	Occasional	Occasional		
Barn swallow*	Abundant	Abundant	Uncommon	
Cliff swallow*	Occasional	Occasional	Uncommon	
Purple martin*	Abundant	Abundant	Uncommon	
Blue jay*	Common	Common	Common	Common
Common crow*	Abundant	Abundant	Abundant	Occasional
Black-capped chickadee*	Common	Common	Common	Common
Tufted titmouse*	Common	Common	Common	Common
White-breasted nuthatch*	Common	Common	Common	Common
Red-breasted nuthatch				Rare
Brown creeper	Common		Common	Common
House wren*	Abundant	Abundant	Occasional	
Winter wren	Occasional		Occasional	
Bewick's wren	Occasional		Occasional	
Carolina wren	Occasional	Occasional	Occasional	
Long-billed marsh wren*	Common	Common		
Short-billed marsh wren*	Occasional	Occasional		
Mockingbird	**Rare**	**Rare**		
Catbird*	Common	Common	Occasional	
Brown thrasher*	Common	Common	Occasional	
Robin*	Common	Common	Common	Rare
Wood thrush*	Common	Common	Common	
Hermit thrush	Common		Common	
Swainson's thrush	Common		Common	
Gray-cheeked thrush	Common		Common	
Veery	Common		Common	
Eastern bluebird*	Common	Common	Common	Rare
Blue-gray gnatcatcher	Uncommon	Uncommon		
Golden-crowned kinglet	Occasional		Occasional	Occasional

Birds found in the Upper Mississippi River wildlife and fish refuge (continued)

Common name	Seasonal abundance			
	Spring	Summer	Fall	Winter
Ruby-crowned kinglet	Common		Common	
Bohemian waxwing				Occasional
Cedar waxwing*	Common	Common	Common	Occasional
Northern shrike			Occasional	Occasional
Loggerhead shrike	Common	Common	Common	
Starling*	Abundant	Abundant	Abundant	Abundant
White-eyed vireo*	Common	Common		
Bell's vireo*	Uncommon	Uncommon		
Yellow-throated vireo*	Common	Common	Common	
Solitary vireo	Occasional		Occasional	
Red-eyed vireo*	Common	Common	Occasional	
Philadelphia vireo	Uncommon		Uncommon	
Warbling vireo*	Abundant	Abundant	Abundant	
Black-and-white warbler	Common		Common	
Prothonotary warbler*	Common	Common		
Blue-winged warbler*	Occasional	Occasional		
Golden-winged warbler	Occasional	Occasional		
Tennessee warbler	Common		Common	
Orange-crowned warbler	Occasional		Occasional	
Nashville warbler	Occasional		Occasional	
Parula warbler	Rare		Rare	
Yellow warbler *	Abundant	Abundant	Occasional	
Magnolia warbler	Common		Common	
Cape May warbler	Occasional		Occasional	
Black-throated blue warbler	Occasional		Occasional	
Myrtle warbler	Abundant		Abundant	
Black-throated green warbler	Common		Common	
Cerulean warbler	Rare			
Blackburnian warbler	Common		Common	
Chestnut-sided warbler	Occasional		Occasional	
Bay-breasted warbler	Occasional		Occasional	
Blackpoll warbler	Common		Common	
Pine warbler	Occasional		Occasional	
Palm warbler	Common		Common	
Ovenbird	Occasional	Occasional	Occasional	
Northern waterthrush	Common		Common	
Louisiana waterthrush	Occasional	Occasional	Occasional	
Kentucky warbler	Rare	Rare		
Connecticut warbler	Rare		Rare	
Mourning warbler	Occasional		Occasional	
Yellowthroat*	Abundant	Abundant	Occasional	
Yellow-breasted chat	Rare	Rare		
Hooded warbler	Rare	Rare		
Wilson's warbler	Common		Common	
Canada warbler	Common		Common	
American redstart*	Abundant	Abundant	Abundant	
House sparrow*	Abundant	Abundant	Abundant	Abundant

Birds found in the Upper Mississippi River wildlife and fish refuge (continued)

Common name	Seasonal abundance			
	Spring	Summer	Fall	Winter
Bobolink*	Occasional	Occasional	Occasional	
Eastern meadowlark*	Common	Common	Common	Occasional
Western meadowlark*	Occasional	Occasional	Occasional	Occasional
Yellow-headed blackbird*	Occasional	Occasional	Occasional	
Red-winged blackbird*	Abundant	Abundant	Abundant	Abundant
Orchard oriole*	Uncommon	Uncommon		
Baltimore oriole*	Common	Common		
Rusty blackbird	Common		Common	Occasional
Brewer's blackbird	Uncommon	Occasional	Uncommon	Rare
Common grackle*	Abundant	Abundant	Abundant	Uncommon
Brown-headed cowbird	Abundant	Abundant	Uncommon	Rare
Scarlet tanager*	Occasional	Occasional	Occasional	
Cardinal*	Common	Common	Common	Common
Rose-breasted grosbeak*	Common	Common		
Indigo bunting*	Common	Common	Occasional	
Dickcissel*	Common	Common		
Evening grosbeak				Occasional
Purple finch	Occasional		Occasional	Occasional
Hoary redpoll				Rare
Common redpoll				Uncommon
Pine siskin	Occasional		Occasional	Occasional
American goldfinch*	Abundant	Abundant	Abundant	Common
Red crossbill				Rare
White-winged crossbill	Rare			Rare
Rufous-sided towhee*	Abundant	Abundant	Abundant	Common
Savannah sparrow	Occasional	Occasional	Occasional	
Grasshopper sparrow	Occasional	Occasional	Occasional	
Henslow's sparrow	Rare	Rare	Uncommon	
Le Conte's sparrow	Uncommon	Uncommon	Uncommon	
Vesper sparrow*	Occasional	Occasional		
Lark sparrow	Occasional	Occasional		
Slate-colored junco	Common		Common	Common
Tree sparrow	Common		Abundant	Abundant
Chipping sparrow*	Abundant	Abundant	Abundant	
Clay-colored sparrow	Uncommon	Uncommon	Uncommon	
Field sparrow*	Common	Common	Common	Rare
Harris' sparrow	Common		Common	
White-crowned sparrow	Occasional		Occasional	Rare
White-throated sparrow	Abundant		Abundant	Rare
Fox sparrow	Occasional		Occasional	
Lincoln's sparrow	Common		Common	
Swamp sparrow*	Common	Common	Occasional	
Song sparrow	Abundant	Abundant	Common	Rare
Lapland longspur	Occasional		Occasional	Occasional
Snow bunting				Uncommon

* Nests on refuge.
Source: United States Department of the Interior, Fish and Wildlife Service. 1975. Birds: Upper Mississippi River Wildlife and Fish Refuge.

APPENDIX D

AMPHIBIANS AND REPTILES FOUND IN THE UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE

Amphibians and reptiles found in the Upper Mississippi River wildlife and fish refuge

Common name	Scientific name	Abundance
Snapping turtle	*Chelydra serpentina*	Common
Wood turtle	*Clemmys insculpta*	Rare
Ornate box turtle	*Terrapene ornata*	Occasional
Map turtle	*Graptemys geographica*	Common
False map turtle	*Graptemys pseudogeographica*	Common
Painted turtle	*Chrysemys picta*	Common
Blanding's turtle	*Emydoidea blandingi*	Common
Smooth softshell	*Trionyx muticus*	Common
Spiny softshell	*Trionys spinifer*	Common
Six-lined racerunner	*Cnemidophorus sexlineatus*	Common
Northern water snake	*Natrix sipedon sipedon*	Common
Brown (DeKay's) snake	*Storeria dekayi*	Uncommon
Red-bellied snake	*Storeria occipitomaculata*	Uncommon
Eastern garter snake	*Thamnophis sirtalis*	Common
Eastern hognose snake	*Heterodon platyrhinos*	Occasional
Ringneck snake	*Diadophis punctatus*	Occasional
Blue racer	*Coluber constrictor foxi*	Common
Fox snake	*Elaphe vulpina*	Occasional
Black rat snake	*Elaphe obsoleta obsoleta*	Common
Bullsnake	*Pituophis melanoleucus sayi*	Common
Eastern milk snake	*Lampropeltis doliata triangulum*	Occasional
Massasauga	*Sistrurus catenatus*	Rare
Timber rattlesnake	*Crotalus horridus horridus*	Rare
Mud puppy	*Necturus maculosus*	Common
Eastern tiger salamander	*Ambystoma tigrinum tigrinum*	Common
American toad	*Bufo americanus*	Common
Blanchard's cricket frog	*Acris crepitans blanchardi*	Common
Spring peeper	*Hyla crucifer*	Common
Gray tree frog	*Hyla versicolor*	Common
Western chorus frog	*Pseudacris triseriata triseriata*	Common
Bullfrog	*Rana catesbeiana*	Common
Green frog	*Rana clamitans melanota*	Common
Leopard frog	*Rana pipiens*	Common
Pickerel frog	*Rana palustris*	Rare
Wood frog	*Rana sylvatica*	Occasional

Source: United States Department of the Interior, Fish and Wildlife Service. 1975. Reptiles and Amphibians: Upper Mississippi River Wildlife and Fish Refuge.

APPENDIX E

FISH OF THE ROOT RIVER BASIN

Fish of the Root River basin[1]

Common name *Scientific name*	Habitat	Range in State	Basin population
American brook lamprey *Entosphenus lamottenii*	Immature specimen buried in soft mud		Uncommon, restricted
Shortnose gar *Lepisoteus platostomus*			Uncommon, larger main rivers
Gizzard shad *Dorosoma cepedianum*			Common, larger streams
Brook trout *Salvelinus fontinalis*	Cold, clear tributaries		Common, restricted
Brown trout *Salmo trotta fario*			Abundant, wide spread, stocked
Coast rainbow trout *Salmo gairdeneri irideus*			Uncommon, stocked, restricted
Bigmouth buffalofish *Megastomatobus cyprinella*			Root River only, moderate
Quillback *Carpiodes cyprinus*			Root River only
Common sucker *Catostomus commersonnii commersonnii*		Widespread	Abundant, widespread
Hognose sucker *Hypentelium nigricans*	Fast riffles of large, clear tributaries		Abundant, widespread
Northern black redhorse *Moxostoma duquesnii duquesnii*			1st State record-Root River basin
Golden redhorse *Moxostoma erythrurum*			Small numbers
Silver redhorse *Moxostoma anisurum*			Rare locally

Fish of the Root River basin[1] (Continued)

Common name *Scientific name*	Habitat	Range in State	Basin population
Northern redhorse *Moxostoma aureolum*			Abundant
Carp *Cyprinus carpio*			Common, widespread
Hornyhead chub *Nocomis biguttatus*	Warmer streams, gravel bottom without vegetation		Common, widespread
Silver chub *Hybopsis storerianus*			Rare
Spotted chub *Erimystax dissimilis*		Rare	Rare
Speckled dace *Extarius aestivalis spp.*			Uncommon
Western blacknose dace *Rhinichthys atratulus meleagris*			Common, widespread
Great Lakes longnose dace *Rhinichthys cataractae cataractae*	Riffles and swift current		Common, widespread
Northern creek chub *Semotilis atromaculatus atromaculatus*			Common, widespread
Northern redbelly dace *Chrosomus eos*		Northern and western basins	Uncommon, restricted
Southern redbelly dace *Chrosomus erythrogaster*	Warmer, slower streams		Common, widespread
Redside dace *Clinostromus elongatus*			Common, restricted
Western golden shiner *Notemigonus crysoleucas auratus*			Common, widespread

Fish of the Root River basin[1] (Continued)

Common name *Scientific name*	Habitat	Range in State	Basin population
Northern redfin *Notropis umbratilis cyanocephalus*	Warm, sluggish waters over silty bottoms		Common, widespread
Lake emerald shiner *Notropis atherinoides atherinoides*	Open portions of larger streams		Common widespread
Plains shiner *Notropis percobromus*			Rare, restricted
Rosyface shiner *Notropis rubellus*	Swift water over hard bottoms		Common, restricted
Northern common shiner *Notropis cornutus frontalis*	Warm, sluggish streams over gravel		Common, widespread
River shiner *Notropis blennius*			Common, widespread
Richardson shiner *Notropis zaenocephalus richardsoni*	Lower portion of Root River		Common, restricted
Spotfin shiner *Notropis spilopterus*			Common, widespread
Central bigmouth shiner *Notropis dorsalis dorsalis*	Shallow sand bars in lower courses of streambed		Common, widespread
Pallid shiner *Notropis amnis*	Lower main river portion		Uncommon, restricted
Northern mimic shiner *Notropis volucellus volucellus*	Large streams		Rare
Ghost shiner *Notropis volucellus buchanani*	Fast, silty water		Common, restricted

Fish of the Root River basin[1] (Continued)

Common name *Scientific name*	Habitat	Range in State	Basin population
Southern sand shiner *Notropis deliciosus deliciosus*			Common, restricted
Lakes spottail shiner *Notropis hudsonius hudsonius*			Common, restricted
Suckermouth minnow *Phenacobius mirabilis*	Warm, clear fast water		Common, widespread
Western silvery minnow *Hybognathus nuchalis nuchalis*	Warm, silty water		Common, restricted
Northern fathead minnow *Pimephales promelas promelas*	Warm, slow-moving water		Common, widespread
Bullhead minnow *Ceratichthys perspicus*	Overflow lakes		Uncommon, restricted
Bluntnose minnow *Hyborhynchus notatus*	Clear, cold streams		Common, widespread
Central stoneroller *Campostoma anomalum pullum*	Warm, soft-bottomed streams		Common, widespread
Southern channel catfish *Ictalurus lacustris punctatus*			Uncommon, restricted
Northern black bullhead *Ameiurus melas melas*	Backwater sloughs, mud bottoms		Common, widespread
Northern yellow bullhead *Ameiurus natalis natalis*	Overflow pools		Uncommon, restricted
Stonecat *Noturus flavus*			Common, widespread

Fish of the Root River basin[1] (Continued)

Common name *Scientific name*	Habitat	Range in State	Basin population
Tadpole madtom *Schilbeodes mollis*			Uncommon, restricted
Western mudminnow *Umbra limi*	Oxbow lakes		Uncommon, restricted
Northern pike *Esox lucius*			Uncommon, restricted
Western pirateperch *Aphredoderus savanus gibbosus*			Uncommon, restricted
White bass *Lepibema chrysops*			Uncommon, restricted
Yellow perch *Perca flavescens*			Uncommon, restricted
Eastern sauger *Stizostedion canadense canadense*			Uncommon, restricted
Walleye *Stizostedion vitreum vitreum*			Uncommon, restricted
Blackside darter *Hadropterus maculatus*	Riffles of larger rivers		Common, widespread
Slenderhead darter *Hadropterus phoxocephalus*			Uncommon, restricted
Northern logperch *Percina caprodes semifasciata*			Uncommon, restricted
Central Johnny darter *Boleosoma nigrum nigrum*			Common, widespread
Bluntnose darter *Boleosoma chlorosomum*			Uncommon, restricted

Fish of the Root River basin[1] (Continued)

Common name *Scientific name*	Habitat	Range in State	Basin population
Eastern banded darter *Poecilichthys zonalis zonalis*			Uncommon, restricted
Iowa darter *Poecilichthys exilis*		Widespread, common	Uncommon, restricted
Northern rainbow darter *Poecilichthys caeruleus caeruleus*	Warm water pools		Common, restricted
Striped fantail *Catonotus flabellaris lineolatus*			Common, widespread
Northern smallmouth bass *Micropterus dolomieu dolomieu*			Common, restricted
Largemouth bass *Huro salmoides*			Common, restricted
Warmouth *Chaenobryttus coronarius*			Uncommon, restricted
Green sunfish *Lepomis cyanellus*			Common, widespread
Pumpkinseed *Lepomis gibbosus*			Uncommon, restricted
Bluegill *Lepomis macrochirus macrochirus*			Common, restricted
Orangespot sunfish *Lepomis humilis*			Common, restricted
Northern rockbass *Amploplites rupestris rupestris*			Uncommon, restricted

Fish of the Root River basin[1] (Continued)

Common name *Scientific name*	Habitat	Range in State	Basin population
White crappie *Pomoxis annularis*			Common, widespread
Black crappie *Pomoxis nigro-maculatus*			Uncommon, widespread
Freshwater sheepshead *Aplodinotus grunniens*			Uncommon, restricted
Northern muddler *Cottus bairdii bairdii*			Common, restricted
Slimy muddler *Cottus cognatus*			Common, restricted
Brook stickleback *Eucalia inconstans*	Associated with water cress		Common, widespread
Northern longnose gar *Lepisosteus osseus oxyurus*			Uncommon, restricted
Northern brown bullhead[2] *Ameiurus nebulosus nebulosus*			Uncommon, restricted
Brassy minnow[2] *Hybognathus hankinsoni*			Common, restricted
Creek chub (3) **Semotilus atromaculatus**			Rare
Northern common shiner **Notropis cornutus Frontalis**			Rare
Rosyface shiner **Notropis rubellus**			Rare

Fish of the Root River basin[1] (Continued)

Common name Habitat	Range in State	Basin population
Great Lakes longnose dace **Rhinichthys cataractae cataractae**		Common
Central stoneroller **Campostoma anomalum pullum**		
Green sunfish **Lepomis cyanellus**		Rare

(1) Moyle, J. B., and W. A. Kenyon. A Biological Survey and Fishery Management Plan for the Streams of the Root River Basin. Fisheries Research Unit, Investigational Report No. 87. Minnesota Department of Conservation, Division of Game and Fish, Bureau of Fisheries. 1949.

(2) Fish species not collected during investigational period covered by report of Moyle and Kenyon (1949), but either collected later or strongly believed to be present.

(3) Hybrid species collected and identified by Moyle and Kenyon, 1949.

APPENDIX F

ENDANGERED AND THREATENED ANIMALS OF THE UPPER MISSISSIPPI RIVER BASIN

Endangered and threatened animals of the Upper Mississippi River basin(1)

Common name *Scientific name*	Status	Present distribution
Indiana bat *Myotis soldalis*	Endangered, estimated population 500,000	Midwest and eastern United States from the western edge of Ozark region in Oklahoma to central Vermont, to southern Wisconsin, and as far south as northern Florida.
Timber wolf *Canis lupus lycaon*	Endangered, estimated population 300-500	Lake Superior region of Michigan, Wisconsin, and Minnesota.
Southern bald eagle *Haliaectus leucocephalus*	Endangered, about 230 active nests in 1963	Nests primarily in Atlantic and Gulf coasts but ranges northward in summer to northern United States and Canada.
American peregrine falcon *Falco peregrinus anatum*	Endangered, estimated population 5,000-10,000	Breeds from northern Alaska to southern Greenland south to Baja, California; winters in northern United States.
Whooping crane Gros americana	Endangered	Prairies of northwestern Canada, migrating south through Nebraska to the coast of Texas and Mexico.

(1) Official List of Endangered Native Wildlife in the United States, as amended and published in the "Federal Register" Vol. 39, No. 3, p. 1175, 4 Jan. 1974.

APPENDIX G

LOCALLY RARE ANIMALS OF THE ROOT RIVER BASIN

Locally rare fauna of the Root River basin (1)

Common name	Scientific name
Moose	*Alces alces*
Canada lynx	*Lynx canadensis*
Bobcat	*Lynx rufus*
Star-nose mole	*Condylura cristata*
Double-crested cormorant	*Phalacrocorax auritus*
Northern bald eagle	*Haliaeetus leucocephalus*
Osprey	*Pandion haliaetus*
Trumpeter swan	*Olor buccinator*
Coopers hawk	*Accipiter cooperii*
Red-shouldered hawk	*Buteo lineatus*
Marsh hawk	*Circus cyaneus*
Great sandhill crane	*Grus canadensis*
False map turtle	*Graptemys pseudogeographica*
Blandings turtle	*Emys blandingii*
Six-lined racerunner	*Cnemidophorus sexilineatus*
Blue-tailed skink	*Eumeces fasciatus*
Massasauga	*Sistrurus catenatus*
Paddlefish	*Polydon spathula*
Blue sucker	*Cycleptus elongatus*
River redhorse	*Moxostoma carinatum*
Greater redhorse	*Moxostoma valenciennesi*
Pirate perch	*Aphredodorus sayanus*
Least darter	*Etheostoma microperca*
Gilt darter	*Percina evides*
Weed shiner	*Notropis texanus*
Skipjack herring	*Alosa chrysochloris*
American eel	*Anguilla rostrata*

(1) Information from Minnesota and Wisconsin Departments of Natural Resources, 1973.

APPENDIX H

HISTORICAL AND ARCHAEOLOGICAL

CORRESPONDENCE

United States Department of the Interior

NATIONAL PARK SERVICE
MIDWEST REGION
1709 JACKSON STREET
OMAHA, NEBRASKA 68102

IN REPLY REFER TO:

L7423 MWR CL

NOV 21 1974

Major Norman C. Hintz
Acting District Engineer
St. Paul District, Corps of Engineers
1210 U. S. Post Office and Custom House
St. Paul, Minnesota 55101

Dear Major Hintz:

Reference your Newsletter of November 1, 1974, requesting comments regarding proposed water resource management plans in the Root River Basin, Minnesota.

No established or studied units of the National Park Service or sites eligible for registration as National Historic, Natural or Environmental Education Landmarks appear to be adversely affected by these projects. Mystery Cave, located in southwest Fillmore County, eight miles southeast of Spring Valley, has been identified as the largest cave in the Upper Mississippi River Valley. Caves are rare in this area and when found are seldom large. In this respect, Mystery Cave is unique; over 12 miles of surveyed passages make it one of the largest caves in this region.

Mystery Cave has been suggested as a potential natural landmark but the development within the cave for ease of commercial usage has detracted from the naturalness of the cave to the point that an evaluation made in 1973 recommended against natural landmark designation.

While Mystery Cave is no longer being seriously considered for natural landmark designation, the cave should not be overlooked in planning for flood control solutions in the Root River Basin. The cave, as mentioned above, is somewhat unique, being located in a region where large or long caves generally are absent.

Our Midwest Archeological Center has provided us with the following comments regarding this request:

"While it is possible that the structural alternatives described in the newsletter could have adverse effect upon archeological

and historical resources along the Root River, it is impossible to evaluate the effects of the various plans without sufficient data regarding the location and significance of such resources.

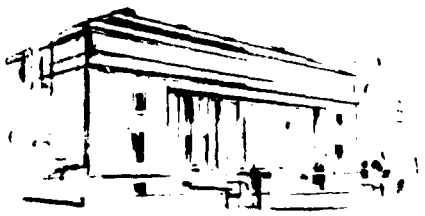
"Accordingly, we would urge your office to initiate timely correspondence with the State Archaeologist (Dr. Elden Johnson, Department of Anthropology, University of Minnesota 55455) and the State Historic Preservation Officer (Mr. Russell W. Fridley, Director, Minnesota Historical Soceity, 690 Cedar Street, St. Paul, Minnesota 55101) of Minnesota regarding known cultural values in the project area as well as their recommendations regarding the need for reconnaissance survey and evaluation of those unrecorded resources which may exist in the project area."

We appreciate your concern for the cultural resources of Minnesota and should you have any questions on the archeological portion of the foregoing, please do not hesitate to contact Mr. Bruce Jones, Midwest Archeological Center, National Park Service, 2605 N. 27th Street, Lincoln, Nebraska 68504, telephone 402-471-5392.

Sincerely yours,

Merrill D. Beal

Merrill D. Beal
Acting Regional Director



MINNESOTA HISTORICAL SOCIETY

Fort Snelling Branch (Building 25), Fort Snelling, St. Paul, Minnesota 55111 • 612-726-1171

November 29, 1974

Norman C. Hintz, Major
Acting District Engineer
Saint Paul District Corps of Engineers
1210 U.S. Post Office and Custom House
Saint Paul, Minnesota 55101

RE: Newsletter
Review of Flood Control and Related
Problems and Solutions Considered
Root River Basin, Minnesota

Dear Major Hintz:

The Newsletter above has been reviewed by the Survey and Planning, and Archaeology sections of the Minnesota Historical Society as per your request. It is the finding of this review that there are several recorded historic and archaeological properties within the basin which may be directly affected by the proposed construction. Historically, surveys have shown concentrations of sites significant in the settlement and economic development of southeastern Minnesota in the areas of Forestville, Peterson, Whalen, Rushford, Grand Meadow and Lanesboro. Due to this concentration, it is apparent that an in-depth survey to record remaining early historic sites is necessary. Archaeologically, the project area is rich. Review of the proposed construction of dams and pools indicates a detrimental effect upon archaeological sites in the Root Valley along the river itself and on terraces which may be covered by the pools. It is therefore requested that an archaeological survey be conducted in addition to the historical survey mentioned above.

Only two towns are included in the mapped details of the project area. It should be suggested that maps of all towns in the project area be included in subsequent newsletters.

Respectfully,

Russell W. Fridley
State Historic Preservation Officer

RWF:bh

cc: Alan Woolworth
Charles Nelson
Douglas George

UNIVERSITY OF MINNESOTA
TWIN CITIES

Department of Anthropology
215 Ford Hall
224 Church Street S.E.
Minneapolis, Minnesota 55455

November 11, 1976

Col. Forrest T. Gay III
District Engineer
St. Paul District, Corps of Engineers
U. S. Post Office Bldg.
St. Paul, Mn. 55101

Dear Col. Gay:

This letter is in response to your request for an appraisal of the revised draft environmental impact statement for Flood Control, Root River Basin, Minnesota

I have read those sections concerned with archaeological and cultural resources on page 18 of the document and have no objections or additions.

Sincerely,

Elden Johnson
State Archaeologist

EJ/tv

cc: R. Fridley

MINNESOTA HISTORICAL SOCIETY

690 Cedar Street, St. Paul, Minnesota 55101 • 612 296-2747

29 October 1976

Colonel Forrest Gay
Department of the Army
St. Paul District
Corps of Engineers
1135 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Colonel Gay:

RE: Flood Control
Root River Basin, Minnesota

I am in receipt of the revised draft environmental impact statement for Flood Control, Root River Basin, Minnesota. Page eighteen of the report refers to a cultural resource report completed under contract with the Corps of Engineers by Mr. Eldon Johnson. Mr. Johnson informs me that his survey was not a systematic one, which would include an on site inspection, but rather a records search of known sites in the Root River. Therefore, taking into account the following information on archaeological sites in the area I would request that a systematic cultural resource survey be made of the area covered by this report.

No sites are listed in the area of Houston where the only construction is to take place, but several artifacts in the Lewis-Mitchell collection are from the SITE LOCATION DELETED

Furthermore several surveys on the upper Root River in Fillmore County and comparable sections of the Zumbro River in Olmsted County, indicate that prehistoric sites are commonly found on the flood plain. Also we do not know whether the proposed construction (a levee around Houston) will have any affect on historic structures. Considering that a total of about 3.1 miles of levee are to be constructed, a cultural resources survey seems warranted.

Thank you for your continued attention to cultural resources in your planning process.

Sincerely,

Russell W. Fridley
State Historic Preservation Officer

RWF/fr

EIS B278